URANOMETRIA 2000.0

Volume 2

DEEP SKY ATLAS

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The Southern Hemisphere to +6°

Introduction

This edition of *Uranometria 2000.0* is a deep-sky atlas that plots more than 30,000 nonstellar objects and 280,035 stars to 9.75 magnitude on 220 double-page charts at a scale of 1.85 cm per degree of declination. In areas of heavy congestion close-up charts are provided at 2 or 3 times this scale with a stellar limiting magnitude approximating 11.0.

While readers familiar with the first edition will see some similarities, many changes and improvements have been made, not only in the visual presentation, but in the underlying data from which it was created. To better understand our methodology, we present here a short history of modern astronomical cataloging.

The modern era of cataloging began in 1958 with the completion of *The National Geographic Society–Palomar Observatory Sky Survey* [POSS] which was a photographic survey of the northern hemisphere night sky taken with the 48-inch Oschin Schmidt Telescope on Palomar Mountain. The southern hemisphere was photographed during 1975–82 using the UK 1.2-meter Schmidt Telescope at Siding Spring Observatory in Australia. While both of these surveys extend beyond the celestial equator, only when combined do we have a high-quality photographic record from pole to pole.

Until recently, catalogs based on these surveys were created by taking visual measurements from the photographic plates, and compiling the data by hand. This methodology made these catalogs highly prone to human error, both in measurement and transcription. Moreover, subsequent works took this earlier data at face value, thus propagating those errors through many years and many catalogs. If a newer catalog does make a legitimate correction, it may be deemed erroneous because it does not agree with the majority of other (incorrect) ones!

Starting in the 1980s, both the POSS and the UK Schmidt Telescope Surveys were digitized (the photographic plates were scanned and converted to computer files) by the Space Telescope Science Institute as part of an eight-year effort to support the Hubble Space Telescope. By the mid-1990s this data, now called the *Digitized Sky Survey* (DSS), and compressed by a ratio of 10:1, was available to the general public for download via the Internet. With the availability of the DSS to anyone with a computer and Internet access it was possible to obtain DSS images and verify catalog data against the original source—the sky itself! However, manually downloading and inspecting images from a very large list of objects would be a daunting task, and corrections would still have to be transcribed by hand—a process both time consuming and open to human error. What was needed was a way t more or less automate the process of inspecting DS images and recording corrections. The solution to thi problem was provided by Emil Bonanno in the form of highly modified version of his commercial computer pro gram, *Megastar: A Sky Atlas for Windows*.

This 1687 allegorical engraving from Johannes Hevelius' *Firmamentu Sobiescianum sive Uranographia* depicts Urania the Muse of the Hea ens, with a stellar tiara and holding the Sun and Moon. She is su rounded by figures symbolizing the five bright planets. U.S. Nav Observatory, Washington, DC.

Normally, *Megastar* allows a user to replace the pro gram's artificial sky with perfectly registered images fron the DSS, while at the same time displaying superimpose scaled symbols from the stellar and nonstellar deep-sk object databases. This allows a user not only to see the rea stars, galaxies, clusters, and nebulae, but also to see wher the various catalogs place them: an object's catalog posi tion, orientation and size can quickly be compared to th actual object recorded on film—and this same image ofte is what the original cataloger used.

Bonnano's custom program added tools to allow the manipulation of the nonstellar deep-sky object symbols: to move them, and to change their sizes and orientation (such as position angle for galaxies). For example, when a specific nonstellar object's catalog symbol did not fall precisely on the DSS image, the symbol could be moved to make the match. The end result is that any changes made in an object's position, size, orientation, etc., were automatically transferred to the *Uranometria 2000.0/Deep Sky Field Guide* database.

Deep-sky objects were selected for inclusion in this atlas using more clearly defined limits than was the case in the first edition. Galaxies were chosen based on an approximate magnitude cutoff of 15 or a major axis of at least 1.5 arcminutes, with occasional exceptions for objects that did not meet the criteria but which had some relationship to another object that did. An example would be a fainter or smaller galaxy superimposed on a larger one. However, all NGCs were included regardless of magnitude or size. In addition, all planetary nebulae known as of early 2000 have been included. All objects from a catalog of open clusters in the forthcoming book *Star Clusters* by Steven J. Hynes and Brent Archinal which were clearly visible on the DSS and likely to be visible with amateur instruments were selected. And new to this edition, all confirmable dark nebulae from Barnard's *Atlas of Selected Regions of the Milky Way, Part II: Charts and Tables* have been depicted. While everyone's favorite "challenge object" may not have been included, what you have before you is a greatly expanded database, with a much higher degree of accuracy and utility, that should push the envelope for all observers.

The Stellar Database

In 1997 the European Space Agency [ESA] published the *Hipparcos and Tycho Catalogues* (ESA SP-1200), which provided highly accurate positions and magnitudes for about a million stars to ~11 magnitude. In 2000 ESA published the *Tycho-2 Catalogue* which increased the database to about 2.5 million stars. The Tycho-2 positions and magnitudes are based on the same observations as the Tycho-1 Catalogue collected by the star mapper of the ESA Hipparcos satellite, but Tycho-2 is much bigger and slightly more precise because it used a more advanced reduction technique. To a very close approximation the Hipparcos/Tycho magnitudes match "true" visual (V) magnitudes. This atlas plots 280,035 of these stars to 9.75 magnitude on the 220 double-page charts and to ~11.0 on the 26 "close-up" charts.

Three data sources were used for determining the variability of stars. The Variability Annex of the *Hipparcos Catalogue* was the reference for over half of the stars of this type. The second source was the variability flag in the Tycho Catalogue, which accounts for about 43% of these classifications. Only those Tycho stars which were flagged as having "strong evidence for variability" were classified as variable. The third source was the *General Catalogue of Variable Stars* [GCVS] (Kholopov, et al., 1998). The Tycho data was correlated with the GCVS, using a combination of positional and magnitude criteria. This resulted in about 6% of the variable star classifications.

Preference was given to the Hipparcos data for assigning minimum and maximum magnitudes, since these values are presumably more reliable than Tycho's. For the variable star names, the majority came from the cross-reference information in the Hipparcos Variability Annex. This was found to be somewhat incomplete, however, and an additional 944 variable names were obtained through correlation with the GCVS.

Uranometria 2000.0 is not intended to be a comprehensive atlas of variable stars, even though more than 6,300 of them are plotted and labeled. The serious variable star observer will encounter omissions. The primary reason for an omission is attributable to the scale of this atlas. Denoting variables in areas densely populated by deep-sky objects, or in rich star clusters, would have introduced excessive clutter on the chart. However, no variable star of "significance" was knowingly omitted for this reason. Most will be found to have a relatively small amplitude (less than 0.2 magnitude), or to reside at the faint end of *Uranometria's* magnitude limit. Our main concern was that we plot those variables which have a large brightness range and a relatively bright maximum to reduce the possibility that an "unexpected" star will alter the star pattern that the observer is using to locate a faint deep sky object.

For example, a star may spend most of its time at 12th magnitude, and then brighten to 7th. An observer who is unaware of the location of such a star may be confused by the new star pattern which this would then present. It is this situation which we have attempted to avoid.

Alternatively, a variable star with a maximum that is near the faint limit of this atlas may decrease in brightness by several magnitudes. In this case, there would be a star missing from the expected pattern. Nominally, the variable star symbol provides a qualitative representation of the minimum and maximum brightness of the star. But for stars whose maximum is 8th magnitude or fainter, the small size of the symbol prevents accurately displaying the star's minimum brightness. In an extreme case, a plotted variable star may decrease to 14th magnitude or fainter. The user should keep this in mind when star-hopping a field containing moderately faint variables.

In order to maintain consistency in *Uranometria 2000.0*, the minima and maxima of variables has been taken from the Tycho and Hipparcos data whenever possible. We would expect that variable star observers will have other sources for this data, and there will no doubt be discrepancies. Compared to most well-studied variable stars, the number of observations made during the Hipparcos mission was relatively small. Therefore this data may not reflect the true extremes of a given star's magnitude range.

Double star classification was based upon both the Hipparcos and Tycho Catalogues. The former contains several indicators of duplicity: "Number of Components," "Double/Multiple Systems Annex Flag," "CCDM Identifier," and "Component Identifiers." All of these were taken

into consideration in the double star classification process. For objects not contained in Hipparcos, the classification process was a bit more difficult. The Tycho Catalogue "resolves" many double stars, giving each component a separate entry. While there is a "duplicity flag" in the Tycho Catalogue, it only identifies those entries which are unresolved. Identification of wider doubles had to be inferred from other information, such as the "Proximity Flag" and "CCDM Identifier." This was supplemented by searching the data for pairs of stars with separations of less than 60 arcseconds. From this information, additional double star assignments were made. With the exception of these doubles, all of the angular separation and position angle data in *Uranometria 2000.0* came from Hipparcos.

Arrangement of Charts and Labeling

This atlas is composed of 220 charts spanning two volumes: Volume 1, *The Northern Hemisphere to –6°* and Volume 2, *The Southern Hemisphere to +6°*. Also included are 26 additional 2× and 3× close-up charts covering congested areas. A third volume, *Deep Sky Field Guide* (DSFG), provides valuable data tailored to the observer's needs, in a condensed form for each chart.

This atlas uses the International Celestial Reference System and the grid is in 2000.0 coordinates measured from the Celestial Equator and Equinox at the beginning of the year 2000. The epoch of the positions is that of the *Hipparcos and Tycho Catalogues* (J1991.25) which, considering the scale of this atlas, is undetectable for all but a very few stars between that date and 2000.0.

Constellation boundaries are based upon those of E. Delporte and endorsed, in 1930, by the International Astronomical Union (*Report of Commission 3*). Precession since then accounts for their no longer being aligned with the great circles of Right Ascension (R.A.) and circles of Declination (Dec). Constellation names are placed near a border for easy identification.

The scale of the main atlas is 1.85 cm = 1° of declination. Stars are drawn as filled circles, their relative size determined by their visual brightness in a smooth taper between 0.0 and 9.7 magnitude. The stellar taper for the close-up maps is 2.0 to 11.5 magnitude. Stars having proper names are so labeled (Castor, Polaris, etc.). The brighter stars are labeled by Flamsteed number and Bayer letter (if one exists). Double or multiple stars with separations less than 1' are indicated by a line protruding from opposite sides of standard-sized dots, with the dot size based on integrated magnitude. For separations greater than 1′ the components are plotted independently.

Variable stars are denoted by a concentric circle-and-dot symbol. The outer circle shows the star's maximum brightness.

The Ecliptic is drawn as a dashed line, labeled (once per chart) "Ecliptic," and calibrated each 1° in longitude. The Galactic Equator is shown with a dashed-dotted line, labeled (once per chart) "Galactic Equator," calibrated each 1° in longitude. Also labeled are the North and South Galactic Poles and the North and South Ecliptic Poles.

In general, deep-sky objects are labeled by NGC number (without prefix, i.e., 7331) or IC number (with prefix "I", I 4567); for the Messier catalog, by a number preceded by an "M," M103. Deep-sky objects may also be labeled by popular names. Objects taken from other works generally are identified by the name of the catalog or an abbreviation of its author's name.

To reduce congestion on the charts, we have chosen to abbreviate prefixes and remove leading zeros as follows:

CGCG = C (C 4-61)
ESO = E (E 30-10)
MCG = M (M-1-22-26)
PN G = P (P 5.2-18.6)
UGC = U (U 7580).

The Close-up Charts

In areas of particularly heavy congestion a shaded rectangular box outlines the boundaries of a 2× or 3× close-up chart. These rectangles are labeled with an "A" followed by a number. Charts with these numbers appear following the main charts.

In some of the most crowded areas of close-up map rectangles found on the main charts, you will notice that the symbols of some objects have been filled with grey shading and are without labels. These objects are identified on the close-up maps.

Navigational Aids

Getting around a large-scale atlas can be a daunting task. To make this atlas more user-friendly a number of navigational aids have been added to it. Immediately inside the front cover you will see four large-scale finder charts that are keyed to both chart numbers, and the tabbed declination bands marked on the outside edge of each right-hand page. Also at the front, immediately following the finder charts, is a table that lists the map closest to the mean center of each constellation along with other "top line" information about the constellations. Next, you will find a 22-map, 6.5-magnitude star atlas keyed to the *Uranometria 2000* charts. These maps provide an intermediate step between the main charts and the finder charts found just inside the front cover.

Turning to the main charts, you will find directions to contiguous ones in the form of arrows around the edges of each chart. The legend on the right-hand page of each includes its R.A. and Dec range along with the names of up to four constellations appearing on it, in order of decreasing area.

Finally, there is a series of Indexes at the back of the book that cross-references star names, Bayer letters, common names, Messier objects and NGC/IC designations. In the companion DSFG the complete nonstellar object list is indexed by chart and DSFG table number. All these Indexes are keyed to objects *within* the R.A. and Dec

boundaries of a given map. Occasionally, objects just *outside* a chart's boundaries are plotted to alert the user that something interesting is just "next door." Where this happens the Index entry is for only the adjacent chart, on which the object falls within its boundaries.

The Nonstellar Database

Galaxies

Uranometria 2000.0 plots 25,895 galaxies. They are shown as open ovals, with objects larger than 5′ drawn to scale. Galaxies with a **major** axis less than 5′ are binned into one of three groups, using symbols to represent the following size ranges: 5′–2′, 2′–1′, and less than 1′. On the 2× close-up maps, galaxies larger than 2.5′ are plotted to scale, and those smaller than 2.5′ are binned as follows: 2.5′–1′, 1′–0.5′, and smaller than 0.5′. On the 3× close-up maps, if larger than 1.7′ they are plotted to scale while those that are 1.7′ or smaller are binned as follows: 1.7′–0.6′, 0.6′–0.3′, and less than 0.3′. For all galaxies other than those that have equal major and minor axes, the symbol is oriented on the chart in the direction of the major axis.

Most galaxies have been listed in more than one of the "standard" catalogs. In this work we have adopted the following labeling precedence: *New General Catalogue* (NGC), *Index Catalogue* (IC) *Uppsala General Catalogue* (UGC), *European Southern Observatory* (ESO), *Morphological Catalogue of Galaxies* (MCG), *Catalogue of Galaxies and Clusters of Galaxies* (CGCG), and *Catalogue of Principal Galaxies* (PGC).

Galaxies are complete star systems. A typical one is composed of billions of stars, while the largest can easily exceed a trillion stars. For the most part, clusters and nebulae in other galaxies are well out of visual range. Amateurs equipped with large scopes will be able to observe detail in only a few hundred of the brightest examples.

For this work galaxies were selected that have a B magnitude of 15 or brighter, or a major axis of 1.5 arcminutes or larger. As noted before, all NGC objects are included regardless of magnitude or size. Positions, dimensions, and position angles were confirmed, or modified where necessary, by visual inspection using *Digitized Sky Survey* images. There are undoubtedly still some identification and positional problems in the resulting galaxy database, but we believe that the procedures we have followed have greatly reduced their number.

Position angles (PA) are given for noticeably elongated galaxies and were obtained directly from a visual inspection of the DSS. Obviously, position angles do not apply to circular objects. These angles, expressed in degrees, are measured from north through east. A value of 0° implies a north-south elongation. A PA of 90° indicates an east-west elongation. After a further quarter-turn counterclockwise, the object is oriented in a PA of 180° (equivalent to 0°), again in a north-south direction. All PAs for galaxies are referred to the first half of the circle, so they do not exceed 179°.

To measure the PA of a galaxy in your eyepiece, you must first determine north as precisely as possible. The best method of doing so, especially for telescopes on altazimuth mounts (Dobsonians, etc.), is to first determine west. This is easily done by centering a bright star in the eyepiece and removing all drives to the telescope so that the star drifts to the edge of the field. The point where the star exits the field is west. North will then be 90° counterclockwise from the west point (clockwise for refractors and Schmidt-Cassegrain telescopes with star diagonals).

Knowing the position angle of a galaxy with respect to others can obviously be very helpful in identifying it in a crowded field. In a similar way, determining the PA of elongation for an "unknown" galaxy aids in identifying it later through catalog descriptions or on sky survey photographs.

Galaxy Clusters

This atlas contains 671 galaxy clusters derived from George Abell's 1958 catalog based upon photographs from Mt. Palomar Observatory. In 1980 Abell issued a revision to this catalog, and in 1984 he died while engaged on a southern extension of it using photographs taken at the Anglo-Australian observatory. This work was expanded upon and subsequently completed in 1989 by Harold Corwin and Ronald Olowin. Objects from the 1958 catalog are designated herein with an "A," while those from the 1989 extension bear an "AS" prefix.

Diameters for "A" objects are taken directly from Abell's revised catalog. Similar data was not available for the "AS" clusters so the diameters were estimated based upon the distance class. For all "A" objects having the same distance class, mean diameters were computed, and those values were applied to the "AS" clusters. Therefore, these dimensions are indicative only, not precisely measured.

Until the advent of very large amateur telescopes and CCD imaging these objects were well beyond the reach of the amateur community.

Open Clusters

This atlas plots 1,617 open clusters, including those in the Magellanic Clouds. They are shown as dotted open circles, with objects larger than 5′ drawn to scale on the main charts.

True open clusters are relatively young objects scattered throughout the disk of the Galaxy. A familiar example is the Pleiades, found on Chart 78. These objects are also known as Galactic clusters, since all but those nearest the Earth are found near the plane of our Galaxy (Chart 8 shows twenty-seven). Over time many objects cataloged as clusters have been proven to be just chance groupings or apparent groupings of unrelated stars. Many of these objects have NGC or IC designations and are well established in the literature. We have chosen to include them as clusters here. The companion DSFG provides specifics.

In the very youngest cases, the remnants of the gas from which they formed are visible as nebulae in the surrounding field. In fact, a small number (78) of open clusters share a single designation with their nebulae. An example is IC 1396 on Chart 19, which is listed as both an open cluster and a bright nebula in the respective sections, has two separate symbols on the chart, and is listed twice in the Index.

The number of stars in these objects ranges from only a few to thousands. In appearance they vary from rich, compact, easily distinguished objects, to a few stars so loosely grouped that they are hardly discernible from the surrounding star field. Many of the latter require experimentation with different apertures and magnifications to be seen. Small telescope users will probably be able to view a larger percentage of open clusters than other types of deep-sky objects.

The principal source used for data on these objects is the book *Star Clusters* by Brent Archinal and Steven Hynes, in press, to be published by Willmann-Bell. This atlas uses a subset of that data which was selected by a review of the entire catalog by direct inspection of the DSS images by DSFG co-author, Murray Cragin. His criteria were general visibility and the likelihood that the object could be seen by amateurs.

Globular Clusters

Some 170 globular clusters, including both Milky Way and Magellanic Cloud objects; are contained in this atlas. They are shown as a continuous-line open circle with an internal cross. On the main charts globulars larger than 5′ are drawn to scale; on the 2× close-up maps they are to scale if their diameter is larger than 2.5′, and on the 3× maps, if they are larger than 1.7′.

While open clusters have irregular outlines, globulars are strongly circular, and their stars are much more numerous, and densely packed toward the center. They are among the oldest objects to be found in galaxies, with ages near 13 billion years. The number of stars comprising them can range from 10,000 to over 100,000. While open clusters are found strictly in the Galactic plane, globulars are grouped into two regions: around the "hub" at the center of our Milky Way and in its extended Galactic halo. All are gravitationally bound to our Galaxy even though a few are twice as far from its center as the Magellanic Clouds! Globulars are most numerous in the direction of the Galactic center (Chart 146 shows 22 of them), although many of these are greatly dimmed by interstellar dust (the non-NGC globulars listed for Chart 145 are examples).

Star Clouds

We have chosen to plot 14 star clouds. These objects are composed of countless stars and often span vast stretches of the night sky. When viewed at low power the nebulosity is often overlaid with sparkling stars which often do not show up in photographs. Usually star clouds are so vast that they cannot be plotted on a large-scale atlas however Chart 164 plots 7: NGC 6360, 6415, 6421, 6437, 6455, 6476 and 6480. Another, M 24 on Chart 145 is a visually striking star cloud that contains a number of other observable objects. Because there are so few of these plotted objects we have not included them in the legend but have assigned a special symbol and annotated the name with "(star cloud)" to aid in their identification. The symbol sizing is the same as that used for open clusters.

Bright Nebulae

We draw to scale 377 bright nebulae with a solid outline if larger than 10′. Objects smaller than 10′ are drawn as solid-line square boxes in two sizes (10′ to 5′ and less than 5′). On the 2× close-up maps they are plotted to scale if larger than 2.5′; on the 3× maps, if larger than 1.7′.

These objects, also called diffuse or Galactic nebulae, occur in two main classes depending on their source of illumination: emission and reflection, although they occasionally are a combination of the two. Much less common is a third type of bright nebula, the supernova remnant (SNR).

Emission nebulae are clouds of dust and glowing hydrogen gas, sometimes referred to as H II ("H-two") regions. The atoms in the cloud are ionized by nearby hot stars, and when the excited electrons fall back to their previous energy state, the process releases energy in the form of visible light. A well-known example is the Lagoon Nebula, found on Charts 145 and 146. Since most of the light visible from emission objects comes from just the three lines produced by hydrogen (Hβ at 4861Å) and oxygen ([OIII] at 5007Å and 4959Å), the use of narrow band "nebula" filters can be helpful in viewing them.

Reflection nebulae have the same composition as emission objects but lack stars sufficiently hot to cause the gas comprising them to fluoresce; therefore, they shine merely by the dust in the nebulae scattering starlight (the gas does not actually reflect any light). Good examples are the nebulosities surrounding the Pleiades star cluster (Chart 78) and M78 in Orion (Chart 116). Because these objects scatter starlight of all colors, filters are not generally helpful in viewing them.

A supernova remnant is the remains of a catastrophic stellar explosion, wherein much of a star's material is ejected, often as a highly-structured cloud. Examples are the Veil Nebula in Cygnus (Chart 47) and the Crab Nebula (M1) in Taurus (Chart 77). These objects have strong emission lines similar to H II regions, hence also benefit from the application of nebula filters.

Dark Nebulae

This atlas contains 367 dark nebulae, which are drawn to scale with a dashed outline if larger than 10′. Objects smaller than 10′ are drawn as dashed-line square boxes in two sizes (10′ to 5′ and less than 5′). On the 2× close-up

maps they are plotted to scale if larger than 2.5′, on the 3× maps, if larger than 1.7′.

Dark nebulae are composed of clouds of dust and gas sufficiently dense as to become opaque. They are detectable if positioned between the observer and a bright nebula or a very dense star field, against which they can be seen silhouetted. Observationally, dark nebulae are among the most difficult deep-sky objects. The Coalsack, near the Southern Cross (Charts 198 and 209), is an example clearly visible to the unaided eye because it happens to lie in front of the rich, starry background of the Milky Way. On the other hand, the well-known Horsehead Nebula (cataloged as Barnard 33 on Chart 116) is much more typical. It is a difficult object because of its small size and because it lies in front of a rather faint background object, emission nebula IC 434. In this case the resulting contrast between the dark nebula and background is very low, making it difficult to distinguish. Dark nebulae are usually seen best with wide-field, low-power eyepieces, which provide a large, bright surrounding field. While these objects emit no light of their own, nebula filters may help increase the contrast if the background is an emission nebula.

Planetary Nebulae

1,144 planetary nebulae are plotted, shown as open circles with four protruding lines, in four sizes representing the following categories: those having diameters greater than 30″, 30″ to 10″, 10″ to 5″ and less than 5″. On the close-up charts two additional symbols are used: greater than 60″ and 60″ to 30″.

Planetary nebulae are shells of gas thrown off by stars having approximately the Sun's mass, that are nearing the end of their evolutionary cycle following the red-giant stage. The shell gradually expands, until after perhaps 100,000 years it becomes undetectably thin and all that remains is the central star. Some of the earliest such objects discovered (e.g., NGC 3242 on Chart 151, and NGC 6210 on Chart 68) were found by William Herschel, who noted the resemblance of their well-defined disks to those of planets, and gave them the name "planetary nebulae", but of course they have nothing to do with planets.

The brightest planetaries have a substantial disk, typically 30 arcseconds across, but the majority listed here are stellar (or nearly so) and can be identified at the eyepiece only with a nebula filter or direct-vision prism. Chart 164 lists over 100 such objects, hardly any of which are larger than a few arcseconds in diameter. A few of the oldest and nearest examples are so distended as to be practically invisible against the background sky. Between these two extremes are planetaries that come in about as many shapes as there are objects, including the aptly-named Ring Nebula on Chart 49 and the complex southern object NGC 5189 on Chart 208.

Invisible light, planetary nebulae shine predominantly at the two wavelengths emitted by doubly-ionized oxygen, denoted by the symbol [OIII]. Typically, 90% of the visually-detectable light comes from the [OIII] lines at 5007Å and 4959Å in the blue-green part of the spectrum. As a result, when an [OIII] filter is placed between the eye and the eyepiece, stars are dimmed by as much as three magnitudes (the night-sky light even more), while light from a planetary passes through virtually unchanged. By rapidly passing an [OIII] filter between the eye and eyepiece and out again while examining the field, a planetary will usually appear to "blink" as the stars are dimmed, and the nebula maintains its brightness. There are a few planetaries that have weak [OIII] emission (a bright example is PN G64.7+5.0, Campbell's Hydrogen Star, on Chart 48), and these are best viewed either directly or with an Hβ filter, which passes the line that is brightest in these cases.

The Greek Alphabet

Alpha	α	Iota	ι	Rho	ρ
Beta	β	Kappa	κ	Sigma	σ
Gamma	γ	Lambda	λ	Tau	τ
Delta	δ	Mu	μ	Upsilon	υ
Epsilon	ε	Nu	ν	Phi	φ
Zeta	ζ	Xi	ξ	Chi	χ
Eta	η	Omicron	ο	Psi	ψ
Theta	θ	Pi	π	Omega	ω

Radio Sources

These objects are shown as open triangles when the source is invisible or below the chart's limit. There are about 260 of them plotted in this atlas. About 100 additional sources are both radio and quasi-stellar objects or x-ray emitters. Where the visible source is plotted, as in the case of a bright star (e.g. δ Cas) or a galaxy, the special symbol does not appear. In order of preference they are identified by their designation from the *Third Cambridge Catalogue of Radio Sources* (3C), the 4C number and then PKS without prefix formed by concatenating the hours and minutes of R.A. with declination truncated to tenths of a degree.

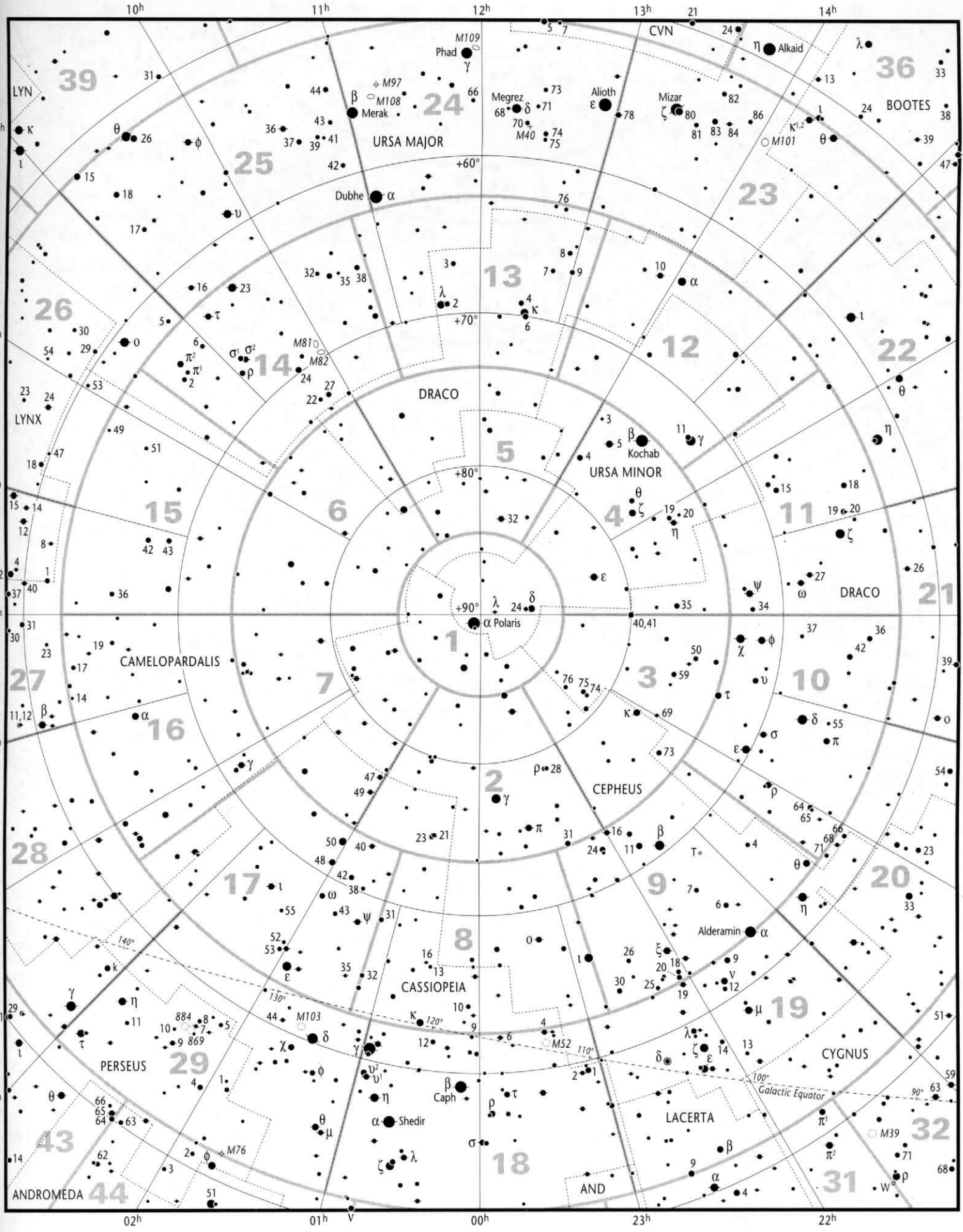
X-Ray Sources

These are shown with an open centered "X" in cases where the source is invisible or below the chart's limit. About 35 of them are included herein. Where the visible source is plotted, the special symbol does not appear. Objects are generally labeled by common name (e.g. M82, NGC 1815, LMC S-2 [Large Magellanic Cloud], or γ Cas).

Quasars

Quasars (Quasi-stellar objects) are identified by open circles with superimposed diagonal line. In order of preference they are labeled with: 3C number, 4C number, and then coordinate designations as established in *Sky Catalogue 2000.0, Volume 2* by concatenating the hours and minutes of R.A. with declination truncated to tenths of a degree.

Uranometria Star Map



Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

Variable Stars

Open Star Clusters

Globular Star Clusters

Planetary Nebulae

Bright Nebulae

Galaxies

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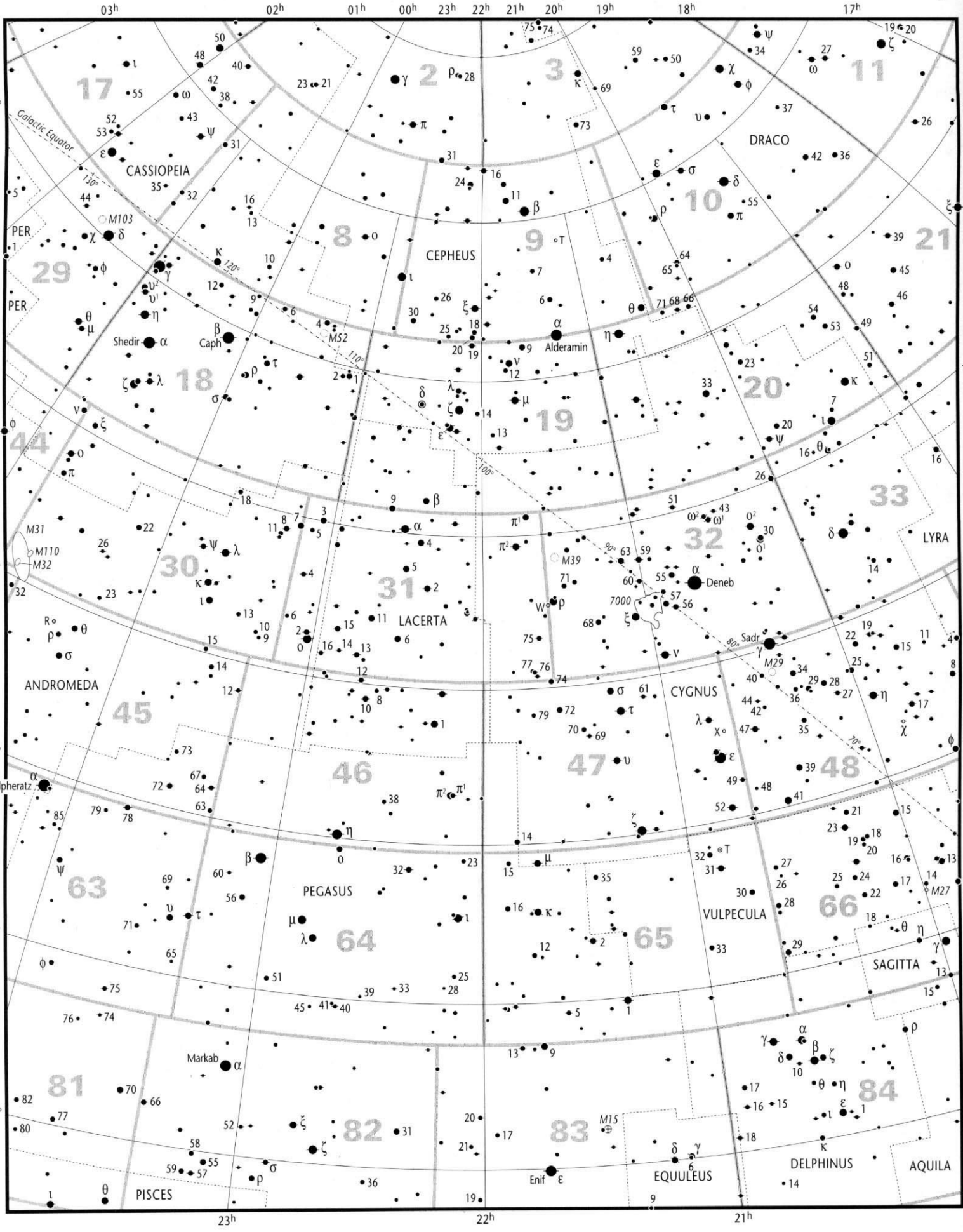
Uranometria Star Map


03h
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18h
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+60°
+50°
+40°
+30°
+20°
+10°
Galactic Equator
CASSIOPEIA
CEPHEUS
DRACO
PER
PER
ANDROMEDA
LACERTA
CYGNUS
LYRA
PEGASUS
VULPECULA
SAGITTA
DELPHINUS
AQUILA
EQUULEUS
PISCES
Shedir
Caph
Alderamin
Deneb
Sadr
Alpheratz
Markab
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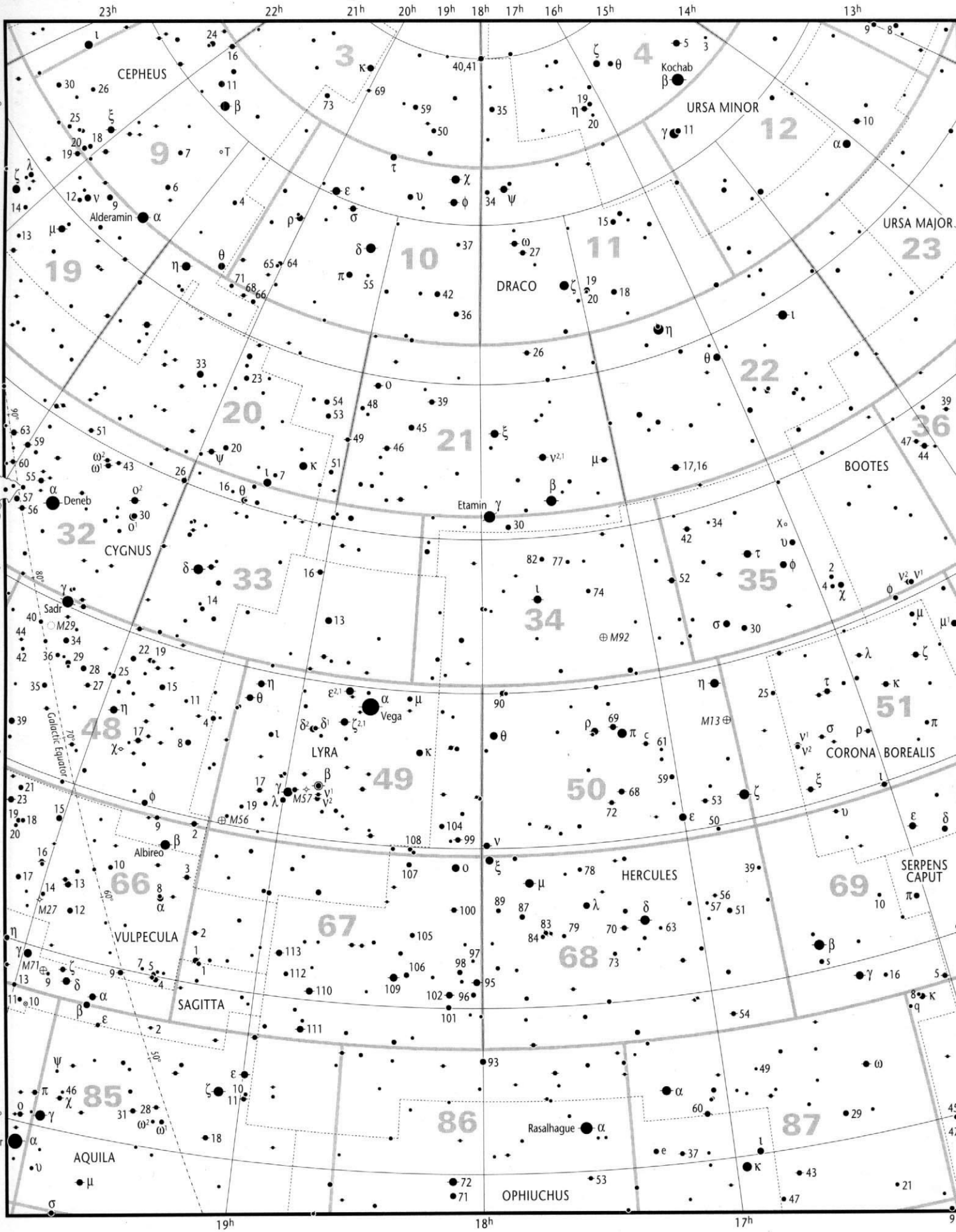
Uranometria Star Map



Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

Variable Stars

Open Star Clusters

Globular Star Clusters

Planetary Nebulae

Bright Nebulae

Galaxies

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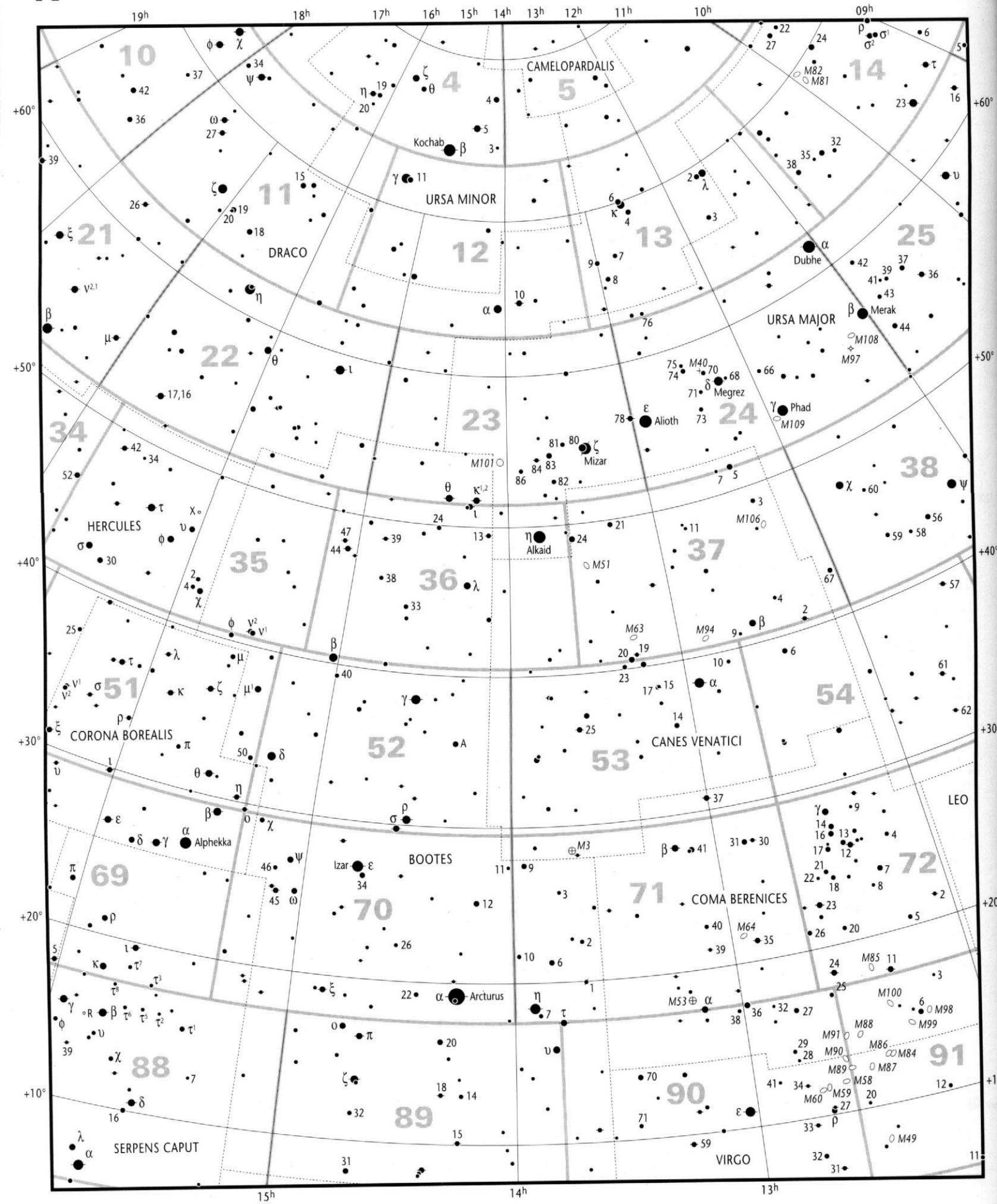

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

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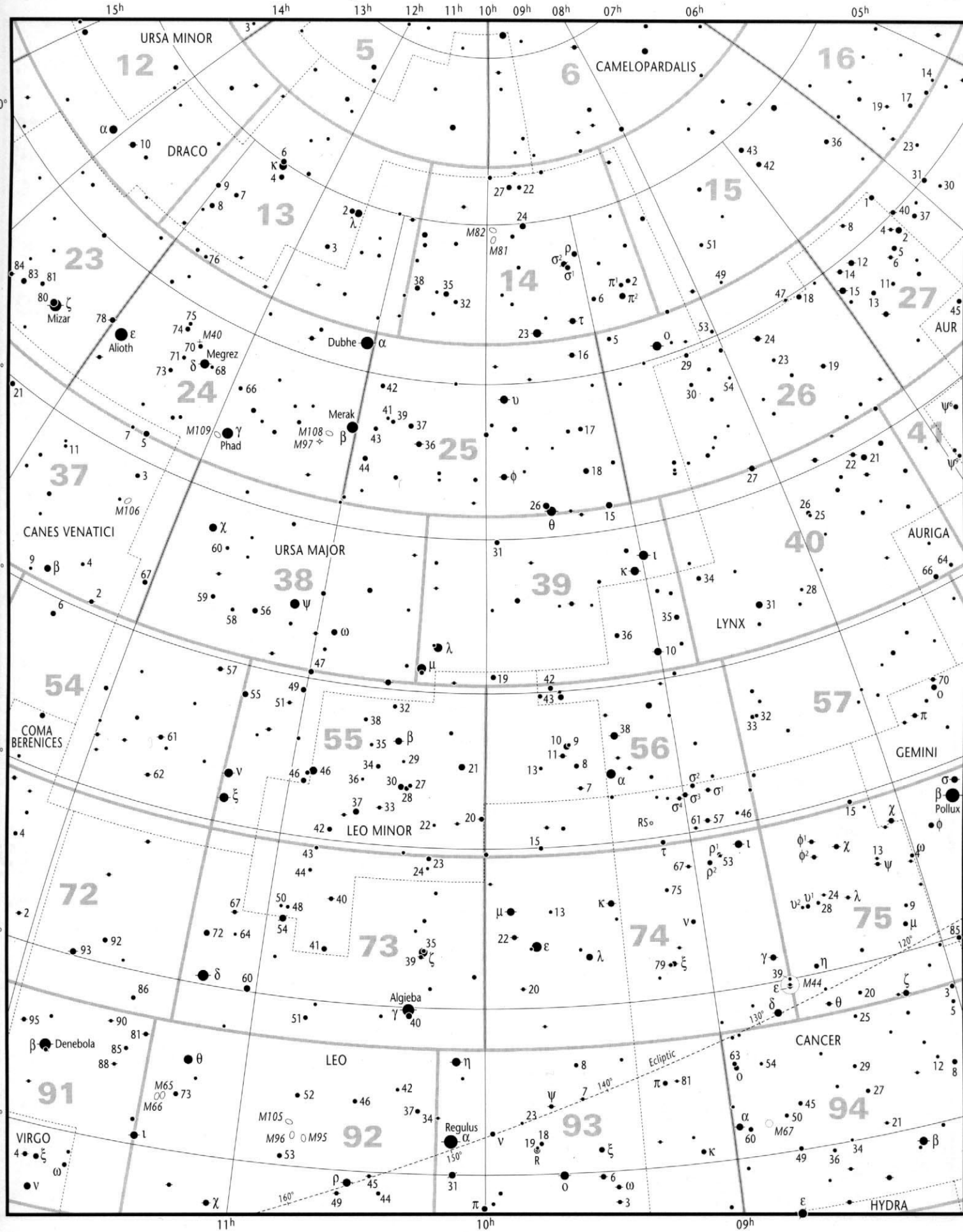

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

Variable Stars

Open Star Clusters

Globular Star Clusters

Planetary Nebulae

Bright Nebulae

Galaxies

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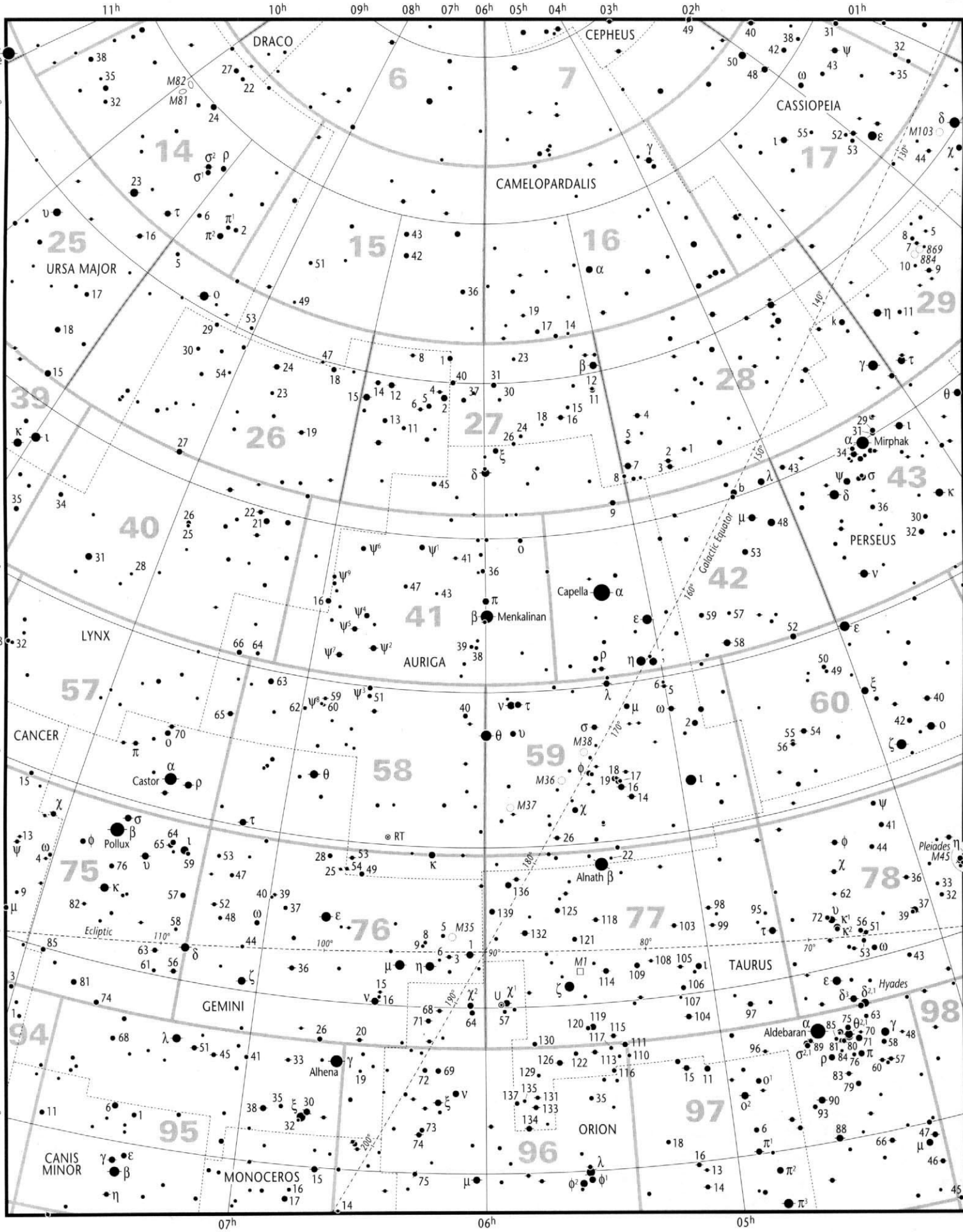
VI

Uranometria Star Map



Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

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Bright Nebulae

Galaxies

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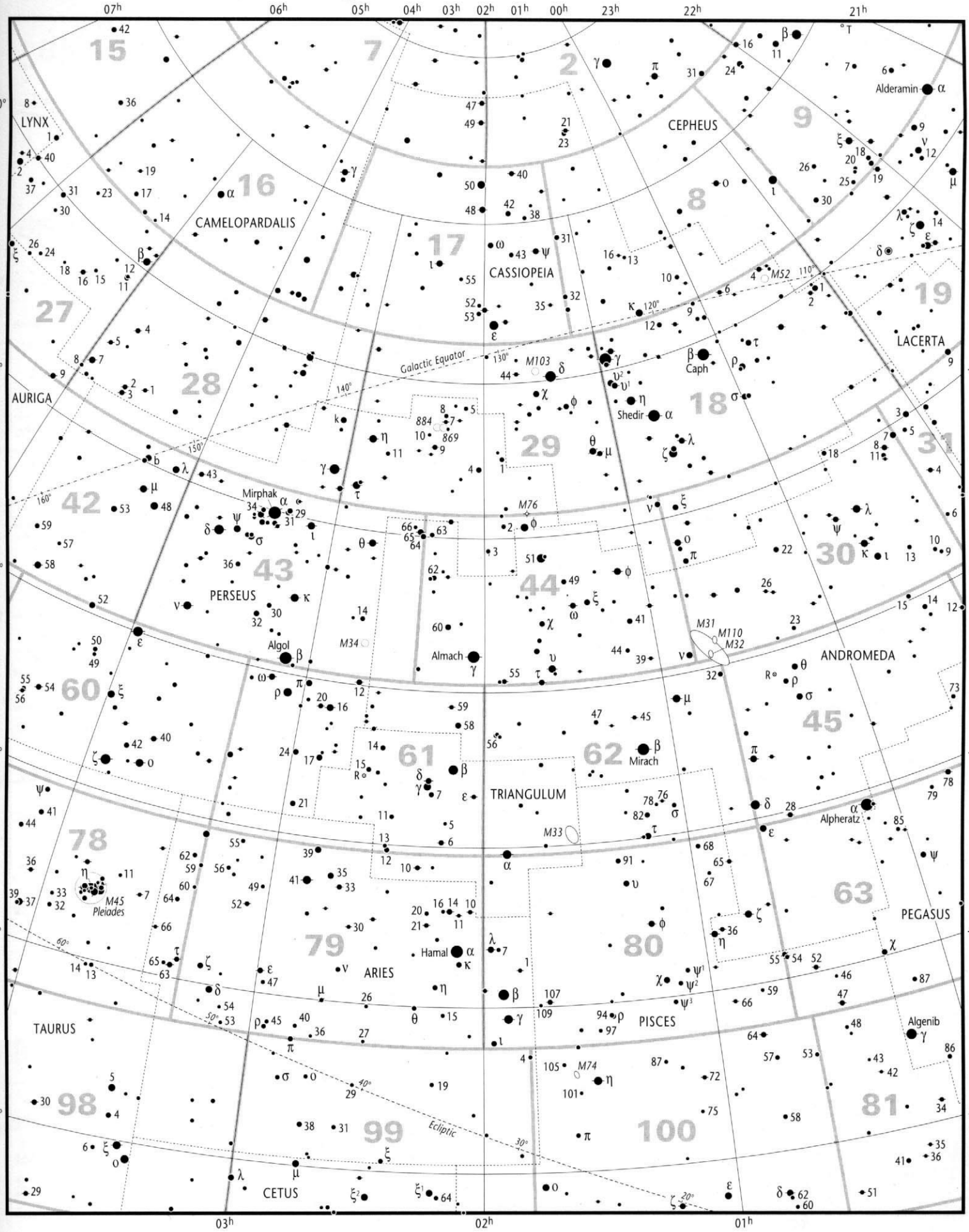

Stellar Magnitudes (V)

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5

Double or Multiple Stars

Variable Stars

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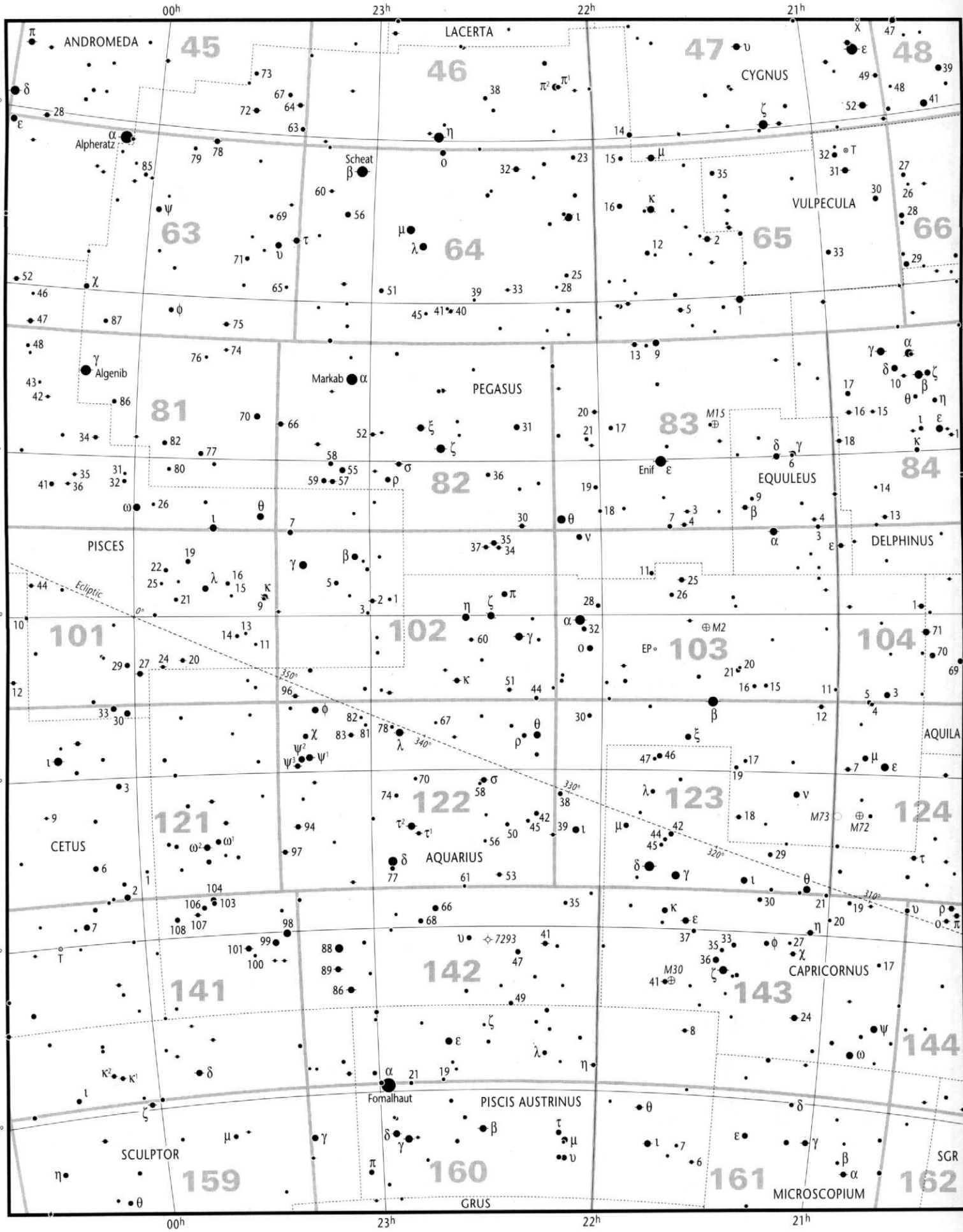

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

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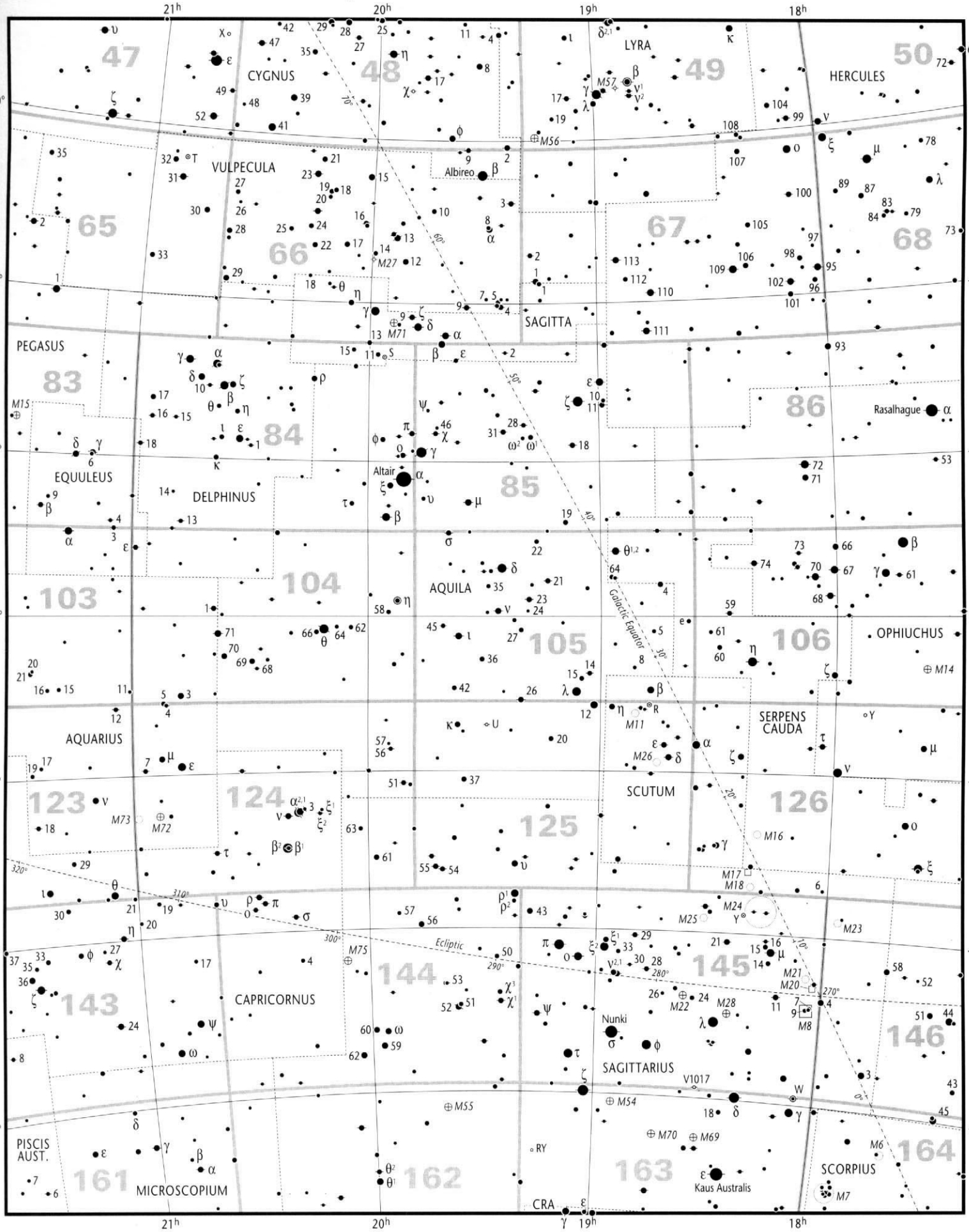

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars
Variable Stars
Open Star Clusters
Globular Star Clusters
Planetary Nebulae
Bright Nebulae
Galaxies

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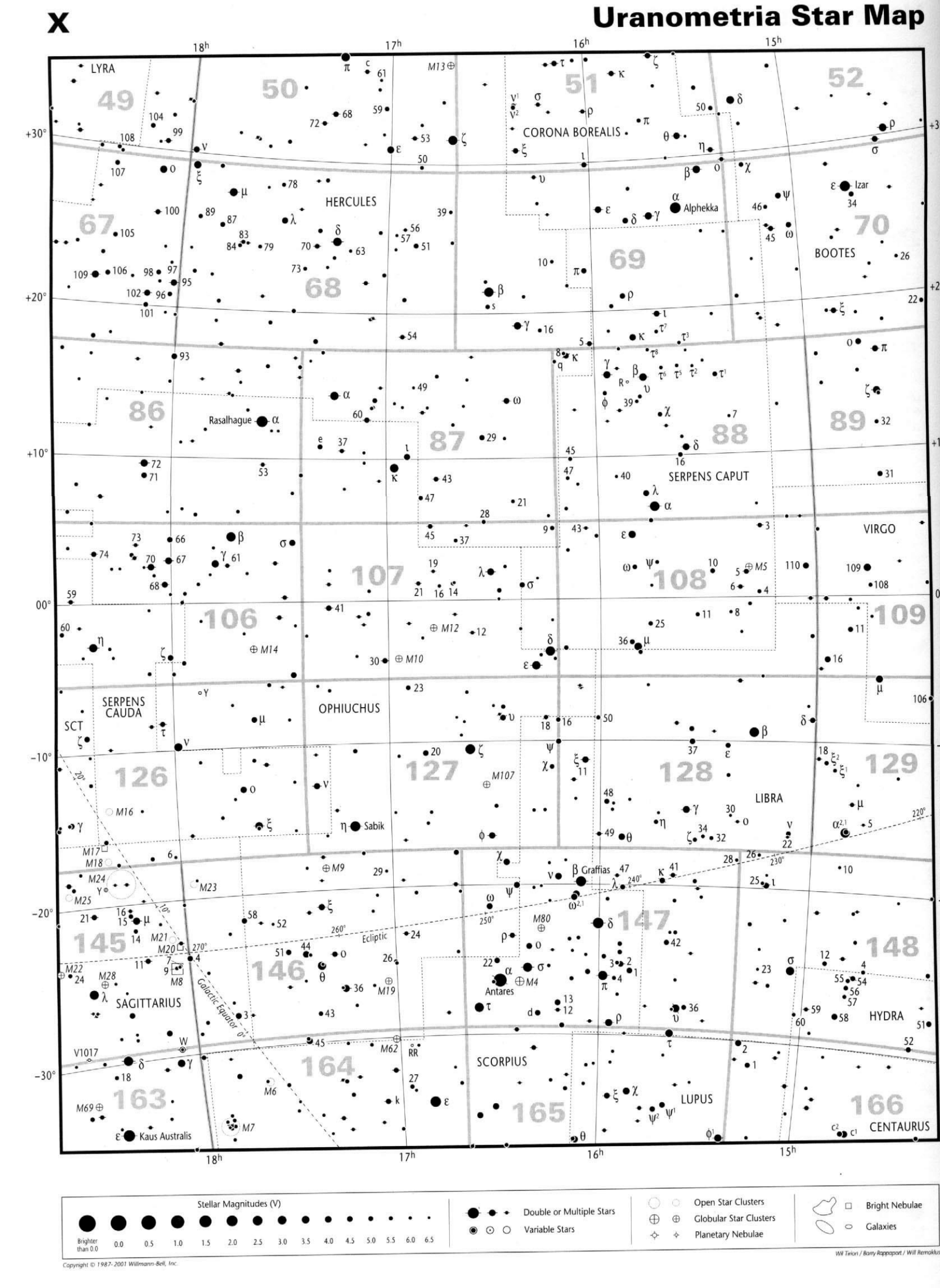
X

Uranometria Star Map



Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

Variable Stars

Open Star Clusters

Globular Star Clusters

Planetary Nebulae

Bright Nebulae

Galaxies

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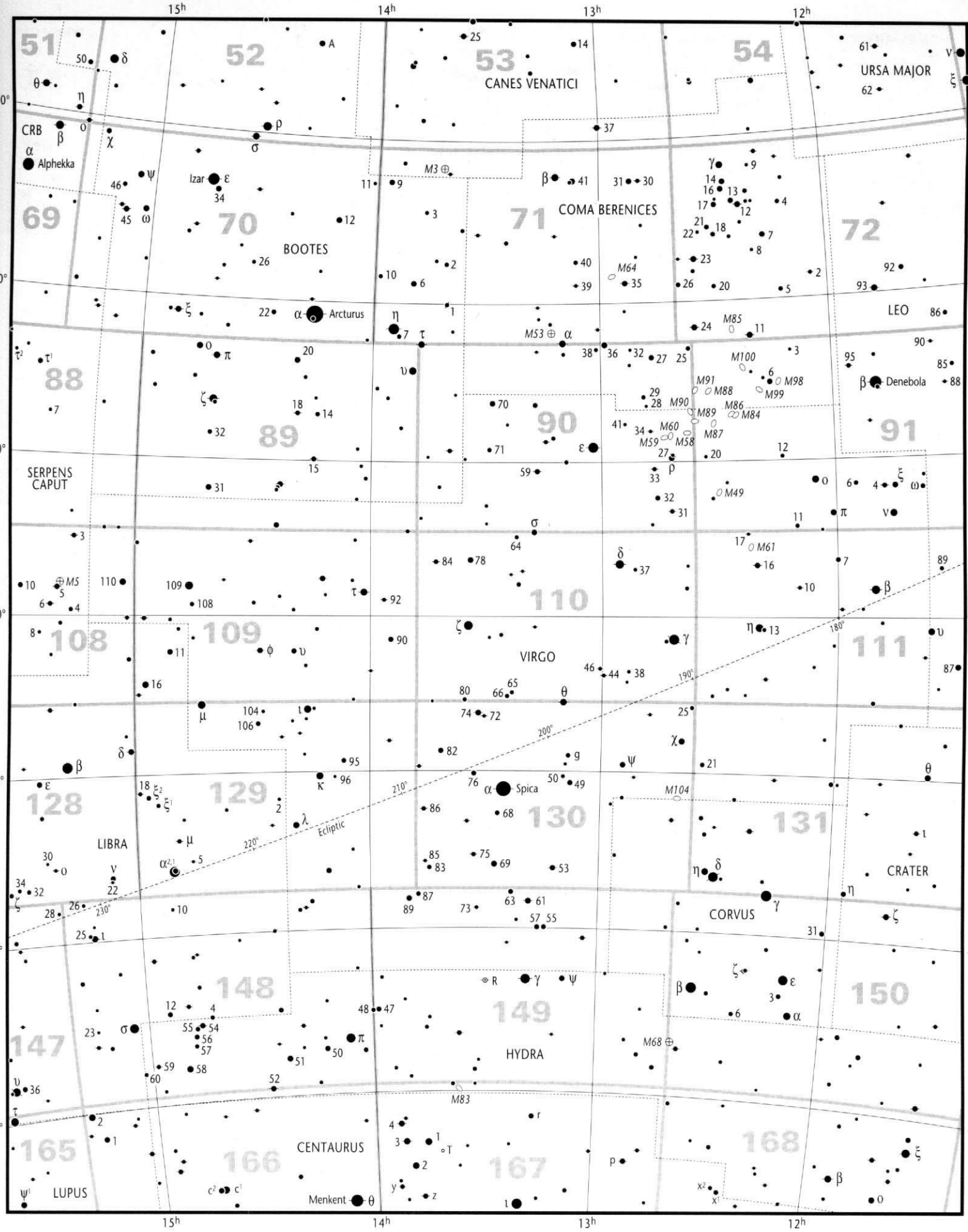

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

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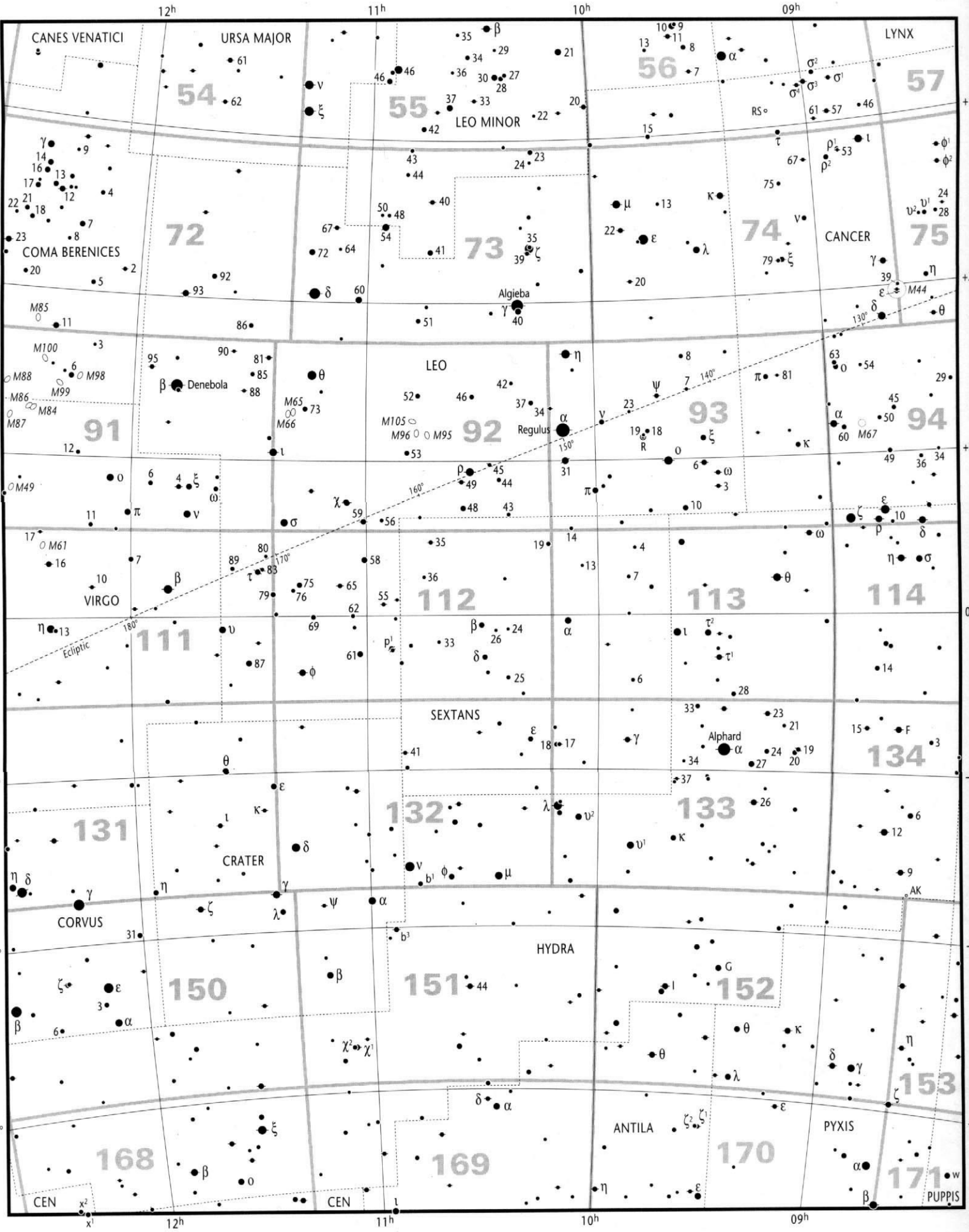

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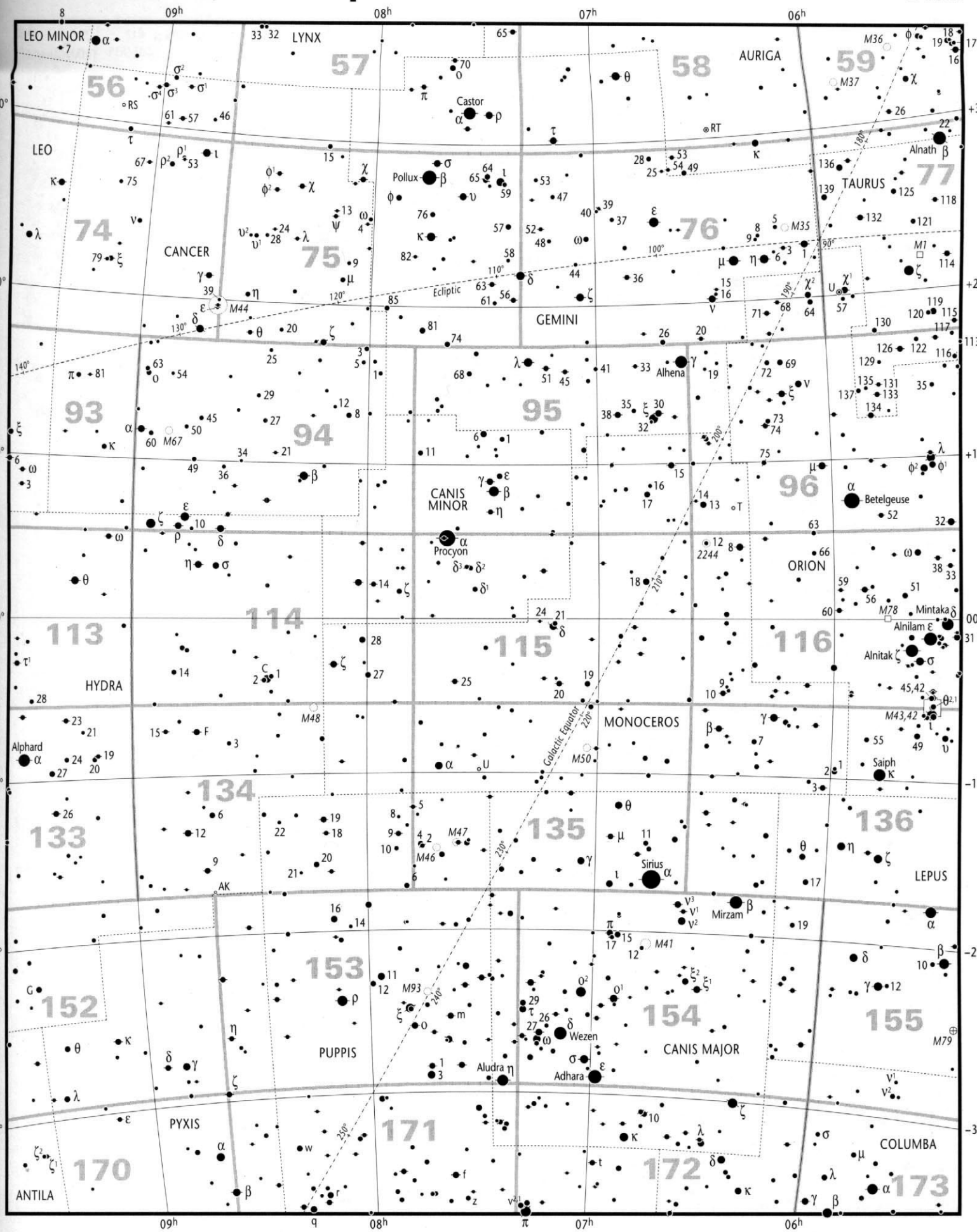
Uranometria Star Map



Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars
Variable Stars
Open Star Clusters
Globular Star Clusters
Planetary Nebulae
Bright Nebulae
Galaxies

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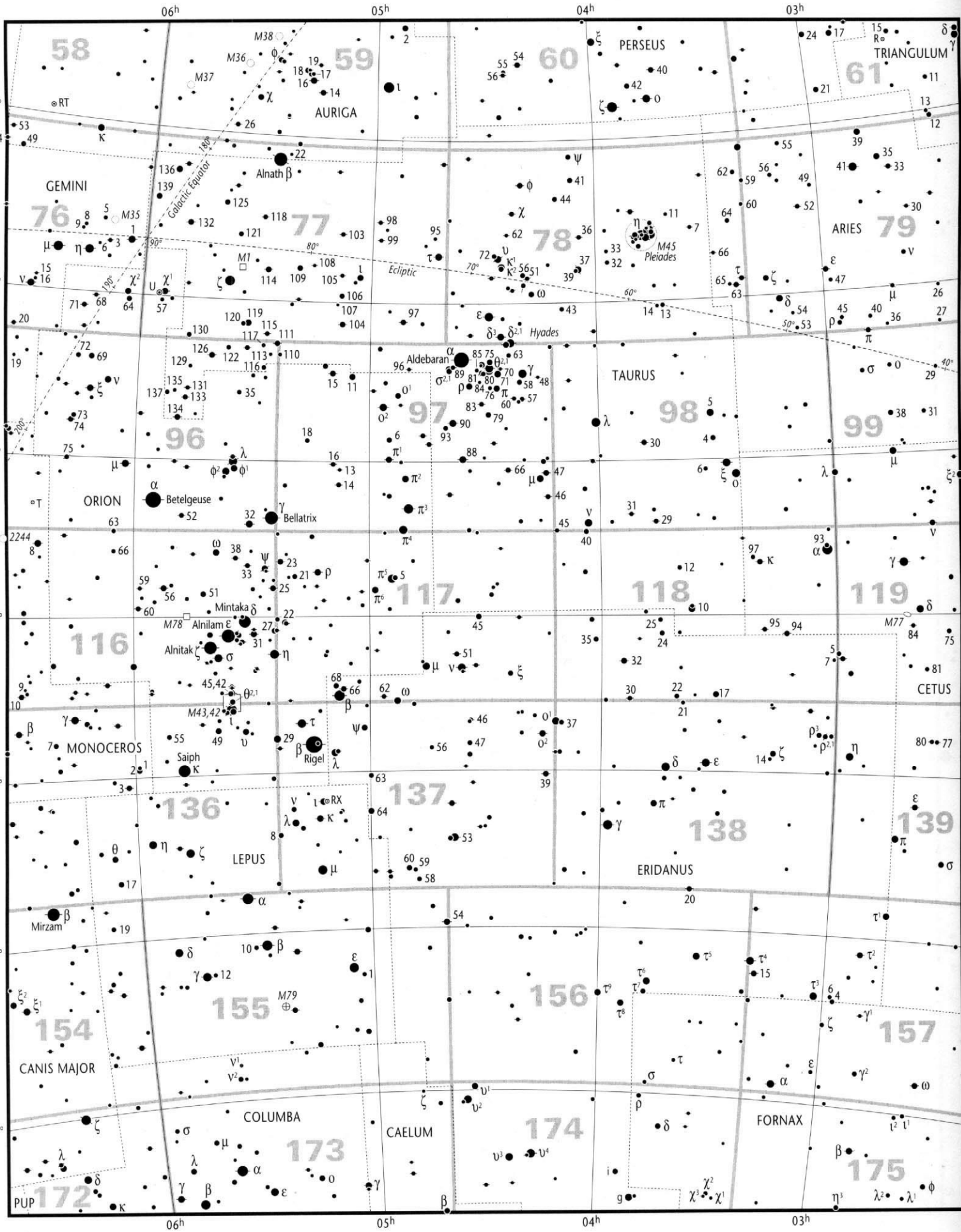

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

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Globular Star Clusters

Planetary Nebulae

Bright Nebulae

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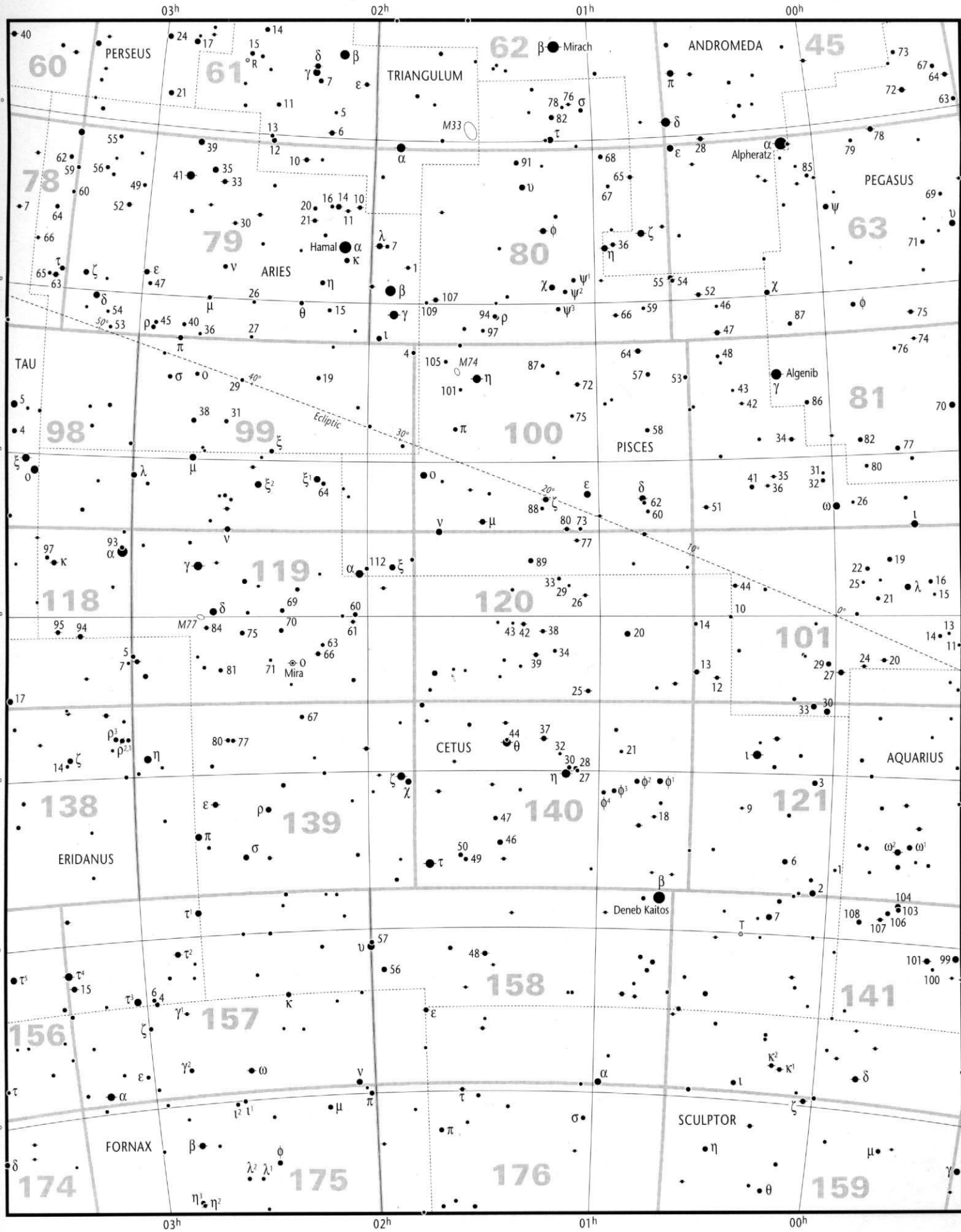

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars
Variable Stars
Open Star Clusters
Globular Star Clusters
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Bright Nebulae
Galaxies

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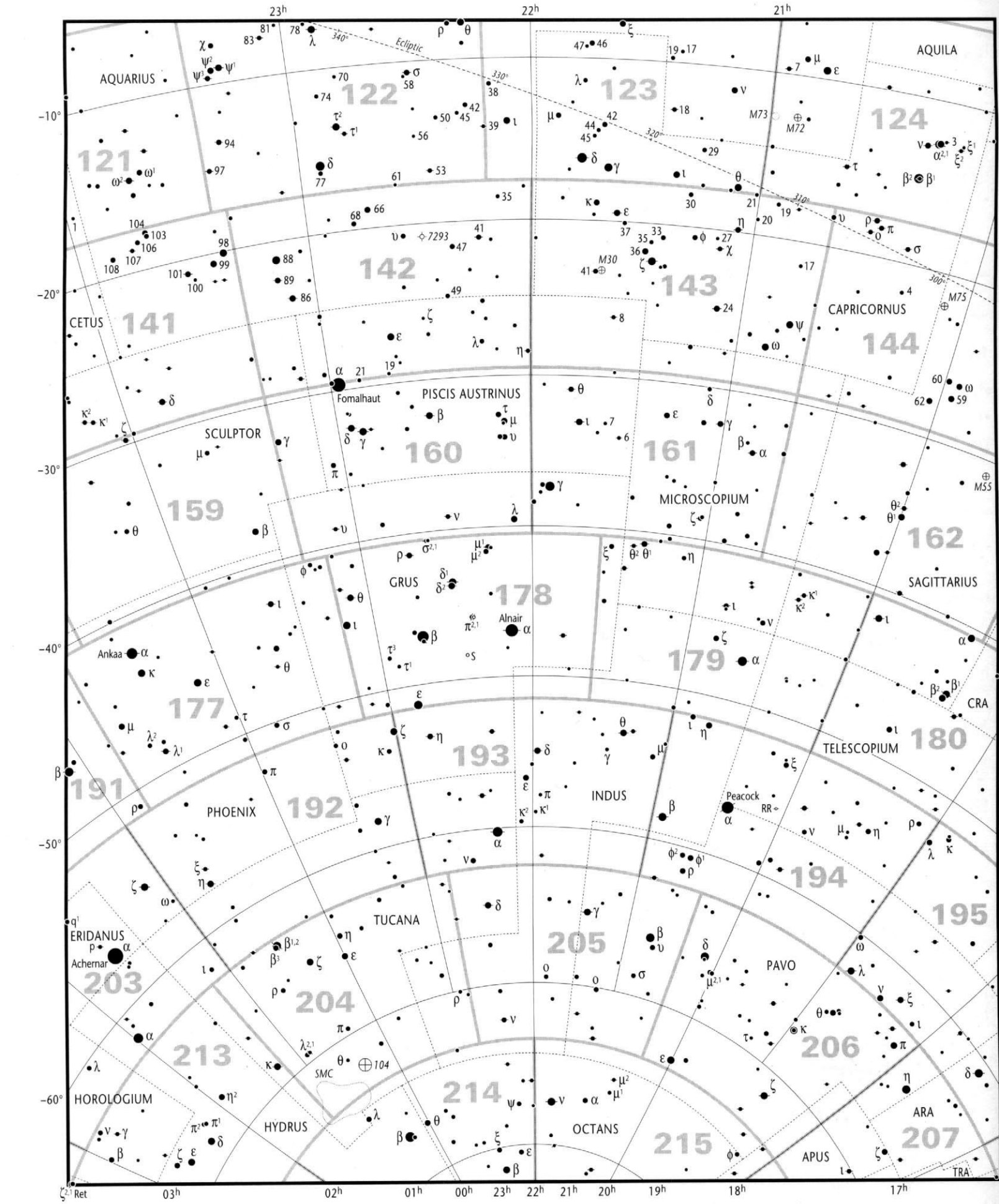

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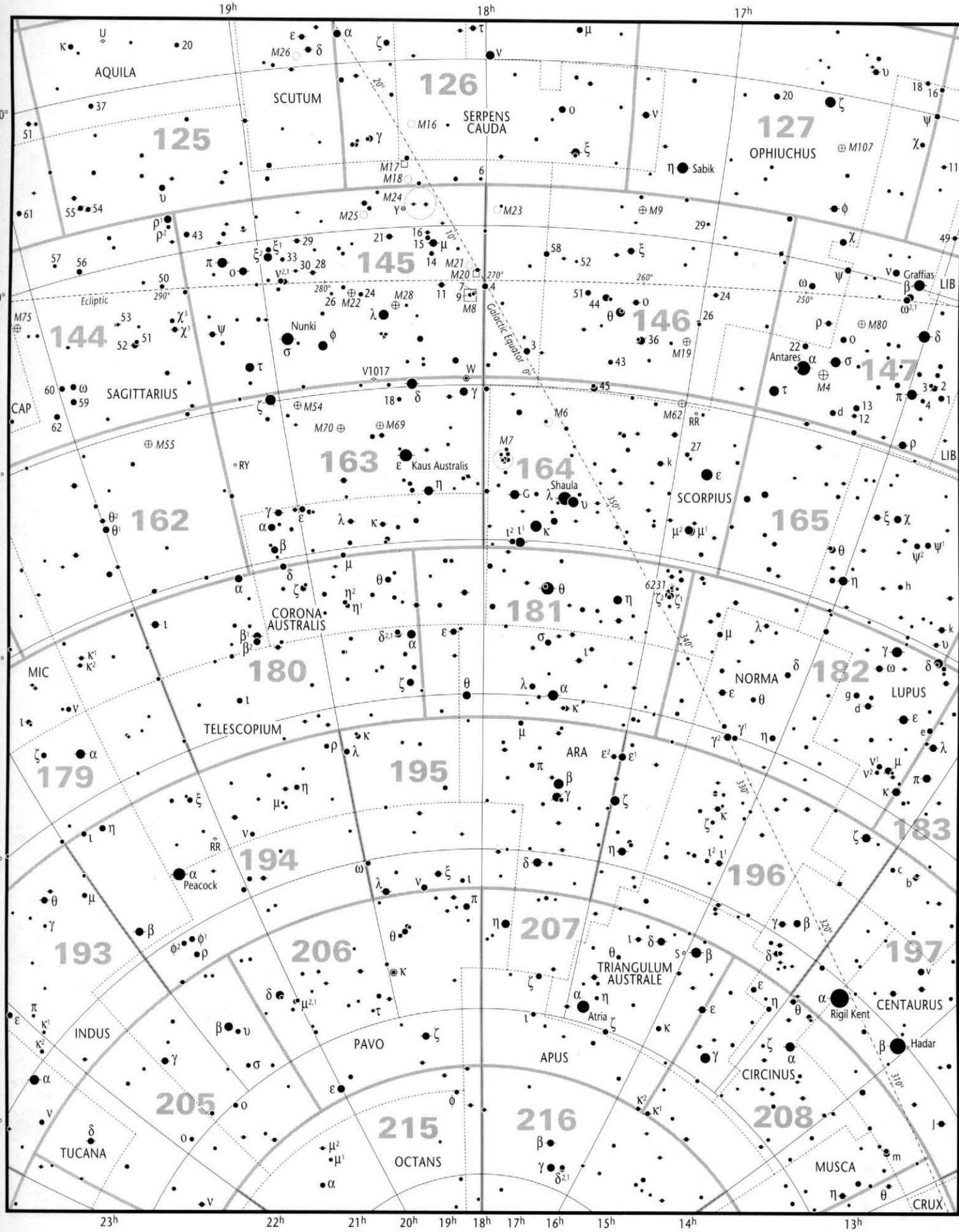

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars
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Open Star Clusters
Globular Star Clusters
Planetary Nebulae
Bright Nebulae
Galaxies

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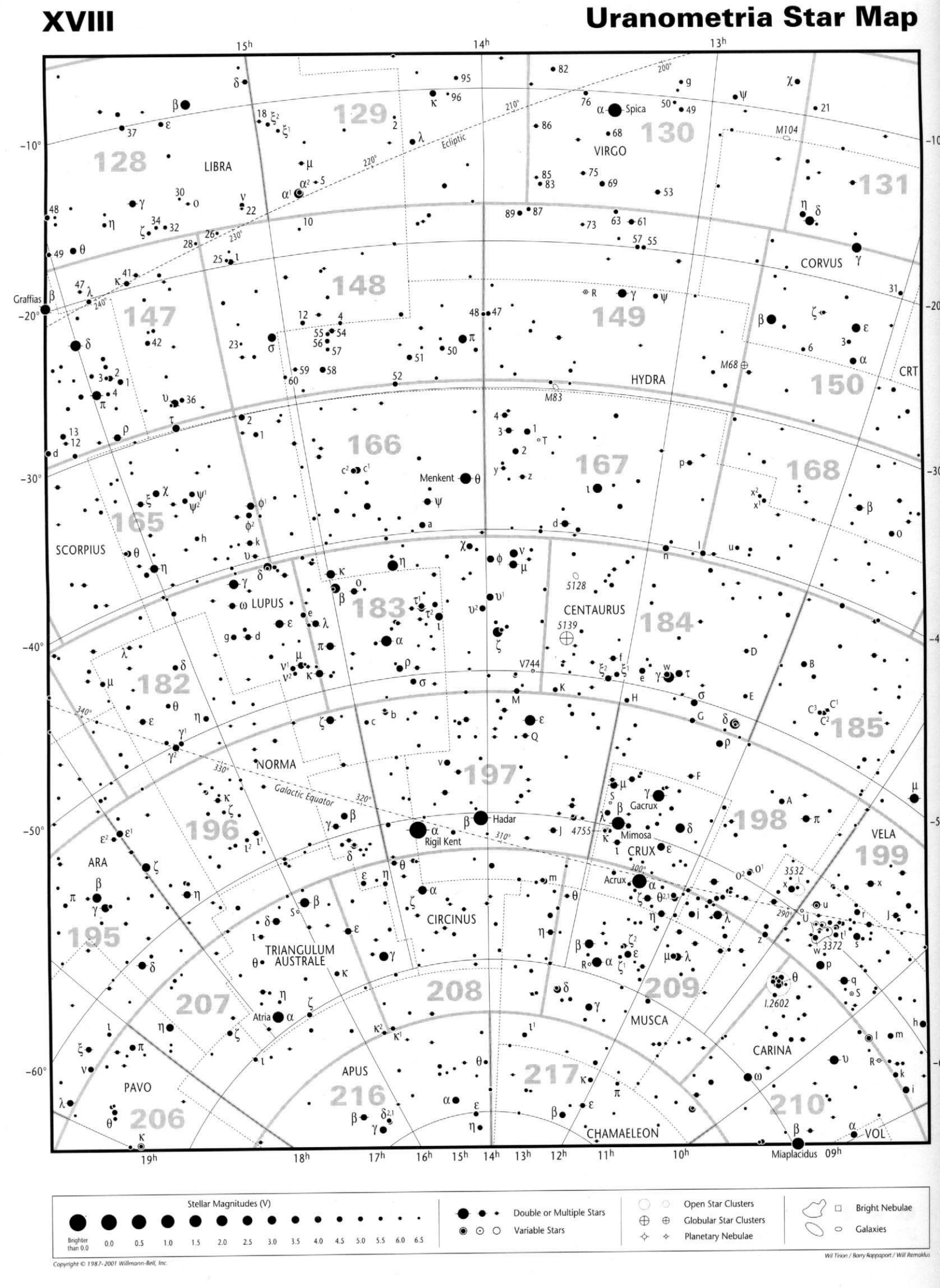

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

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Bright Nebulae

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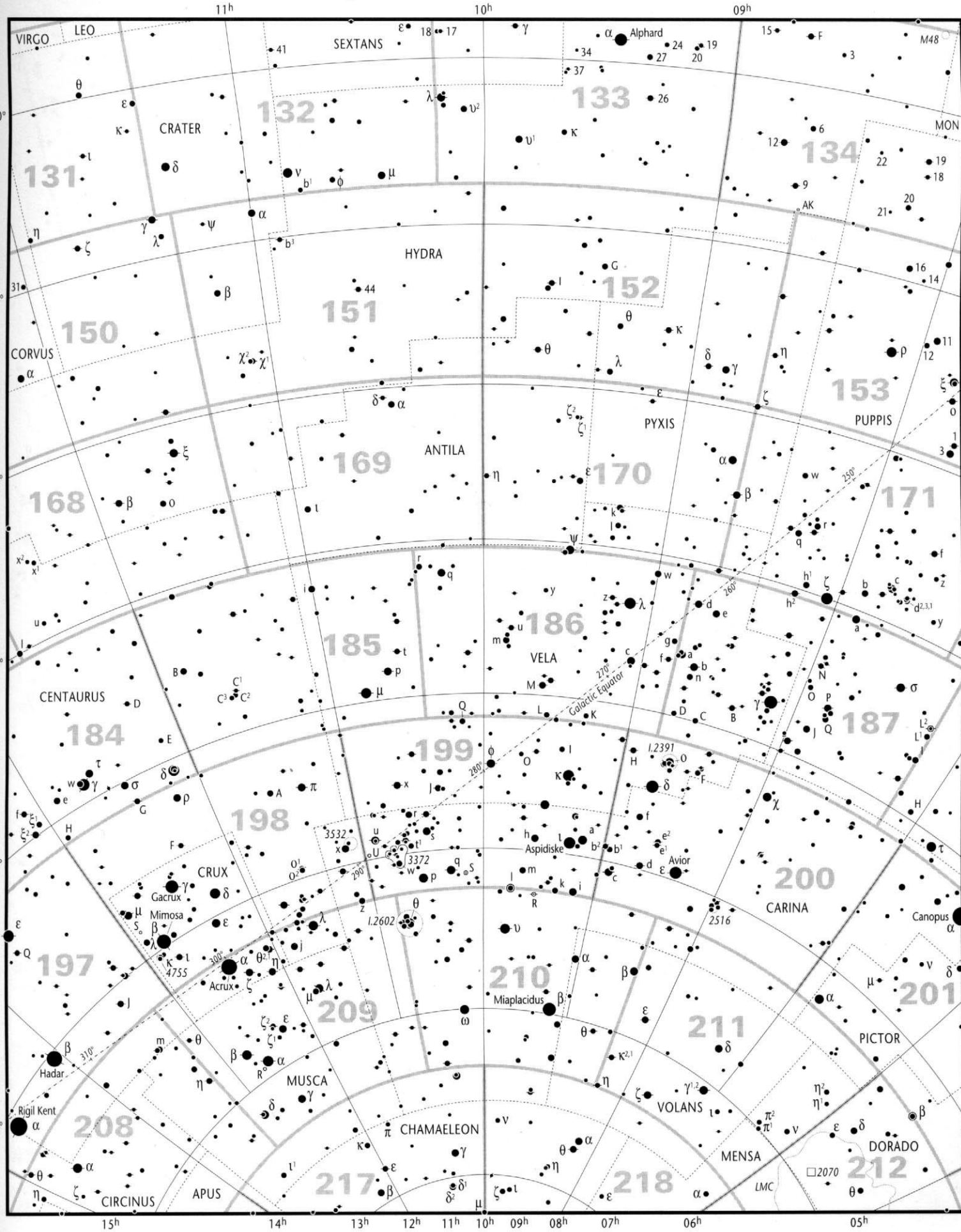

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

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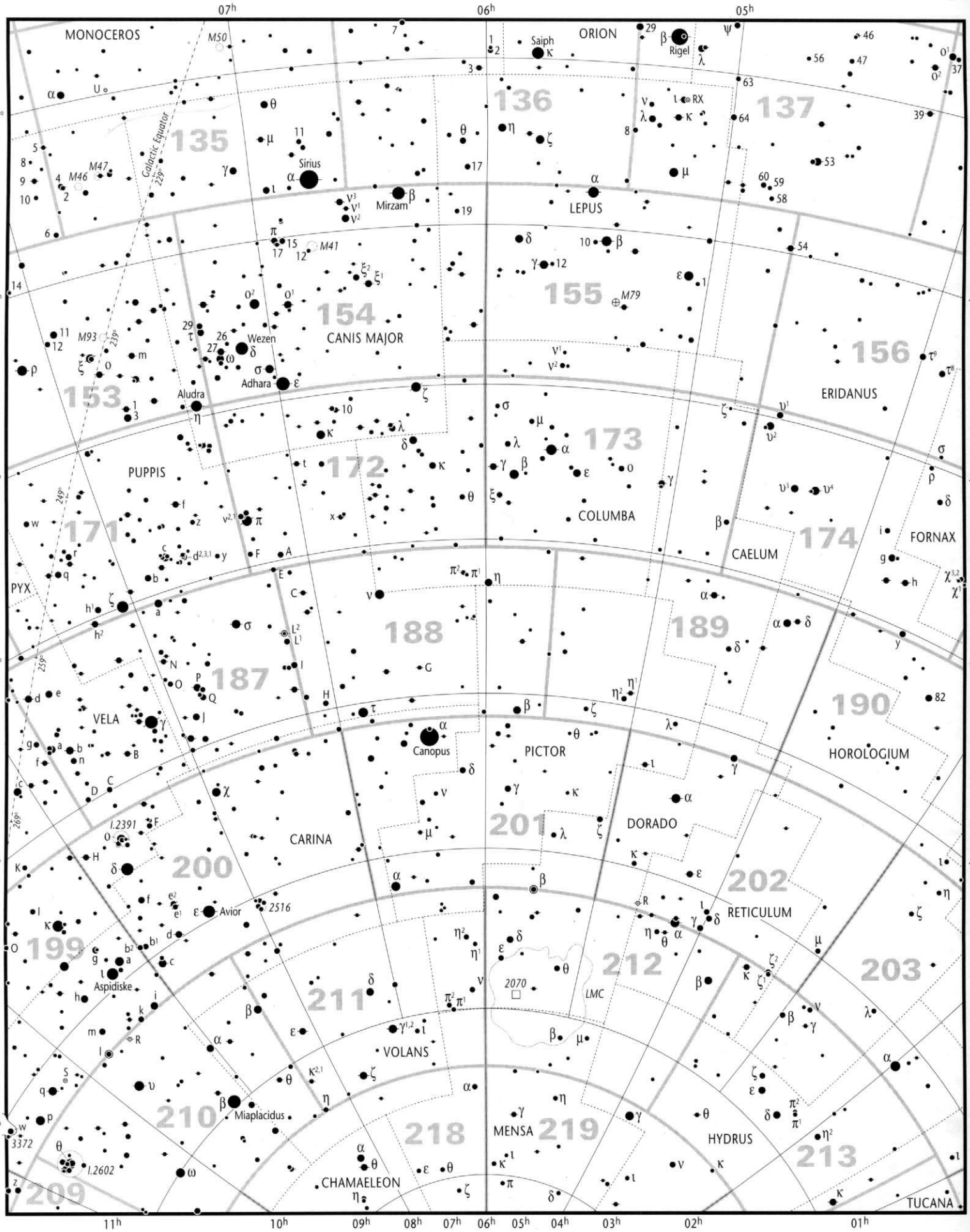

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

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Bright Nebulae

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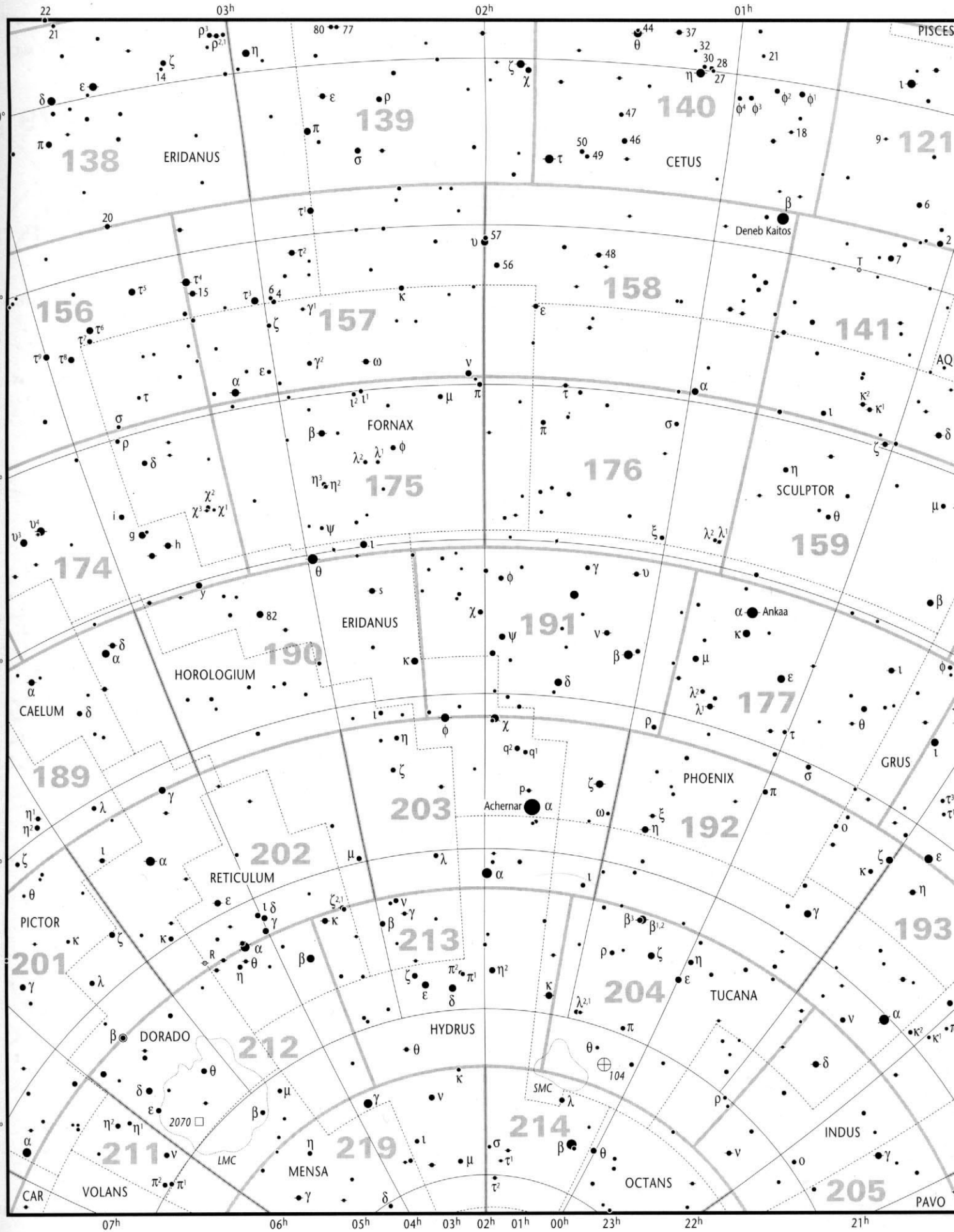

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

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Bright Nebulae

Galaxies

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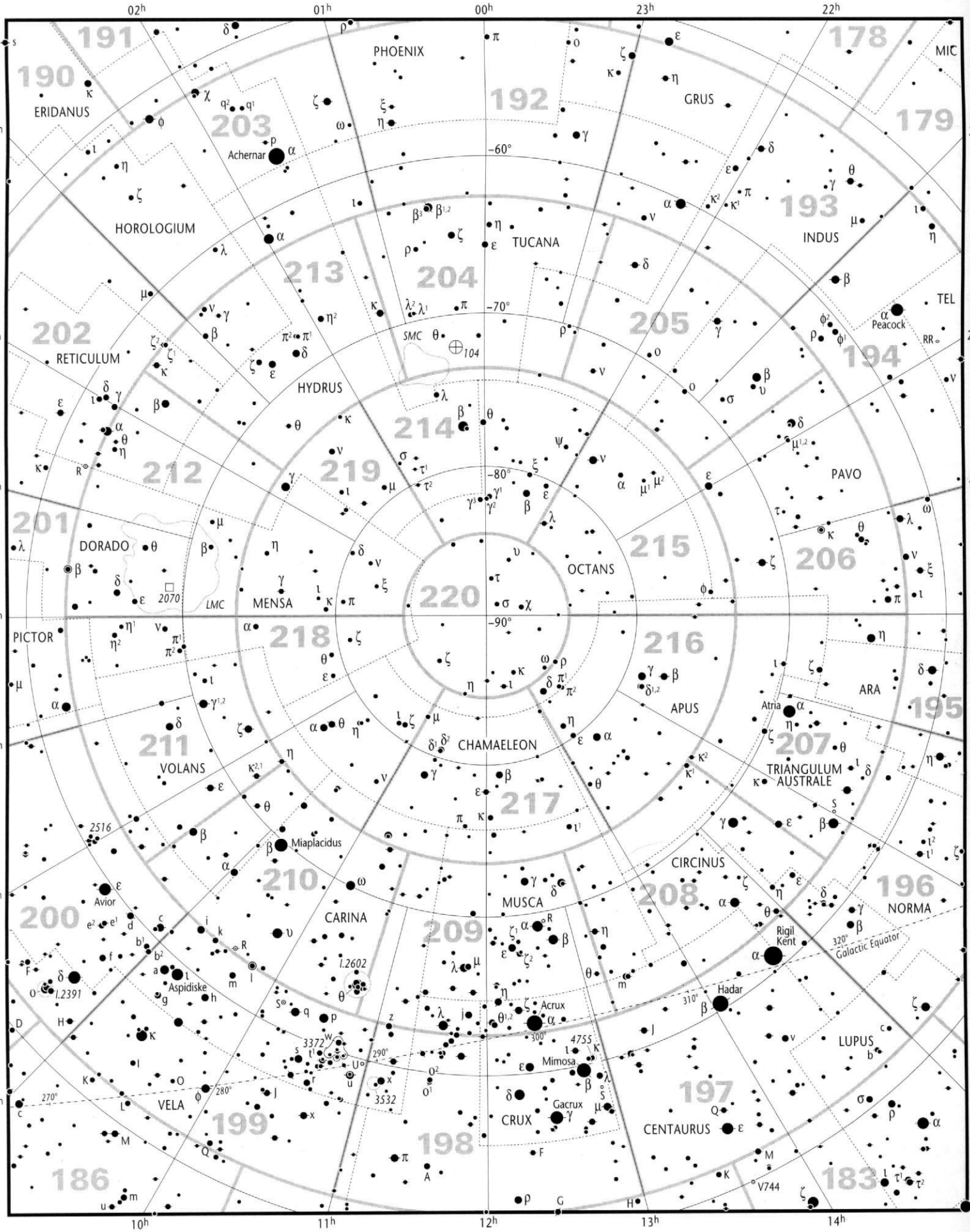

Stellar Magnitudes (V)

Brighter than 0.0 | 0.0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5

Double or Multiple Stars

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Open Star Clusters

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Planetary Nebulae

Bright Nebulae

Galaxies

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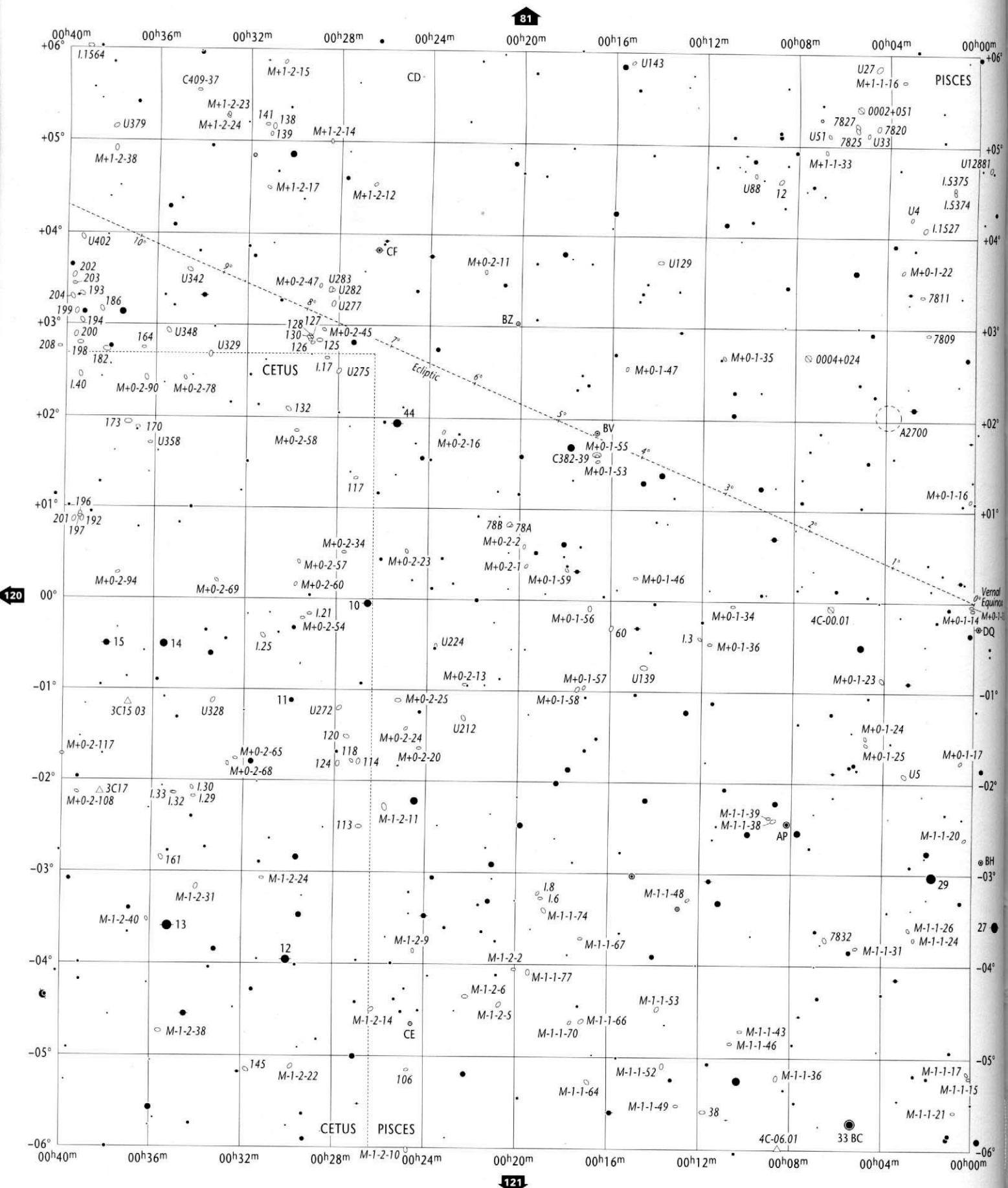

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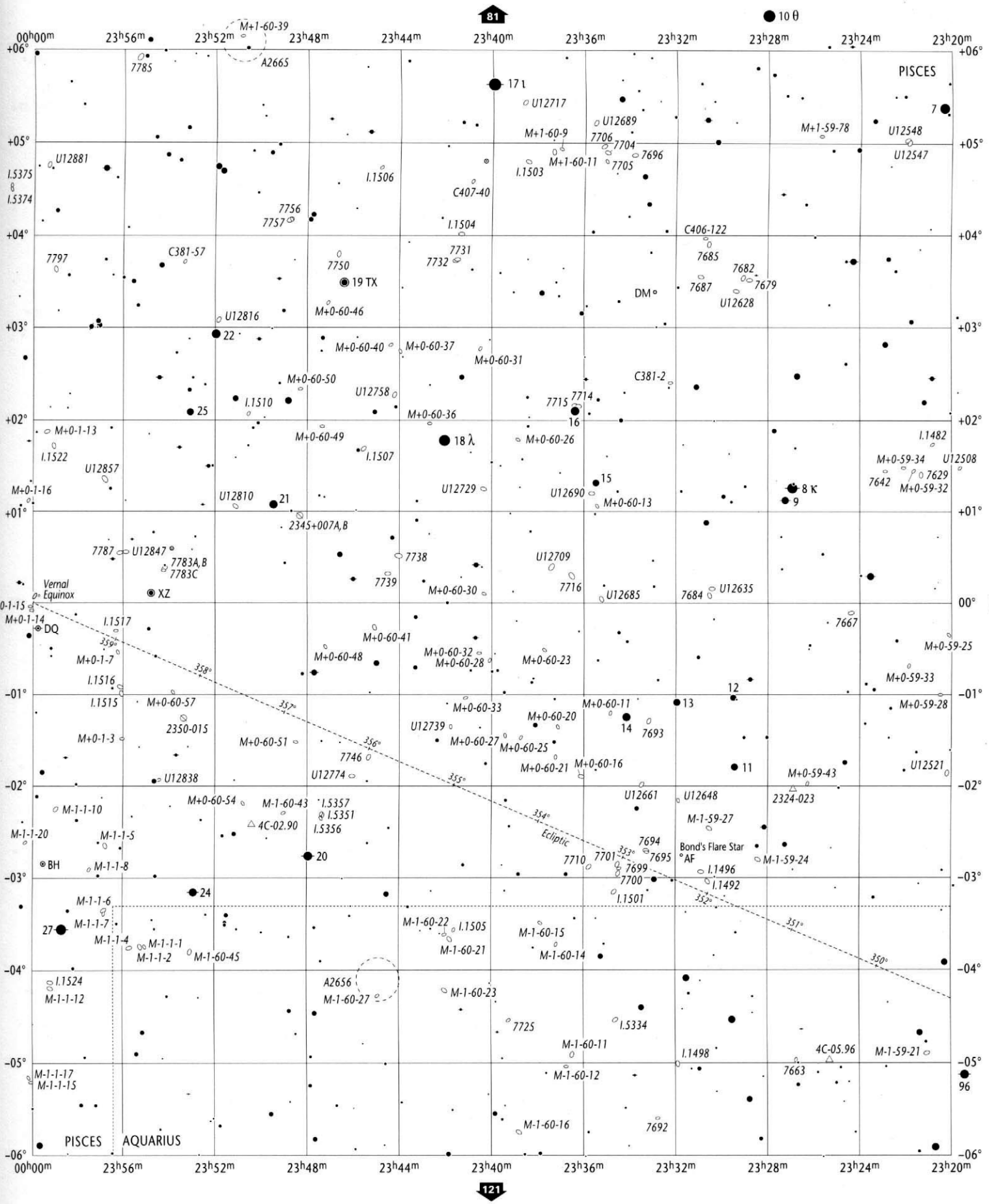

Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale <5'	to scale <5'	>30" 30"-10" 10"-5" <5"	to scale 10'-5' <5'	>5' to scale; 5'-2' 2'-1' <1' major axis	to scale

00h40m to 23h20m
+06° to -06°

PSC
CET, AQR

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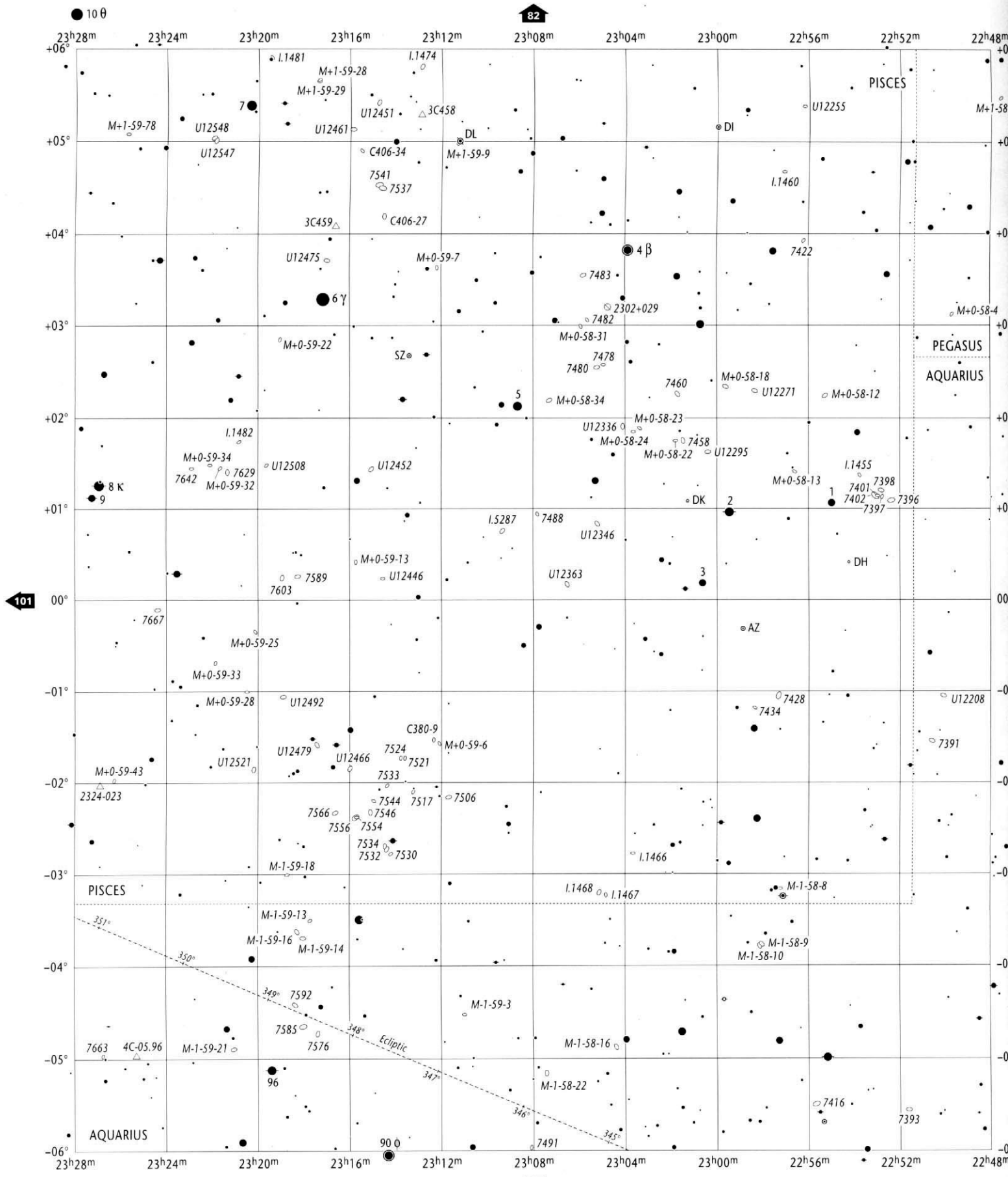

Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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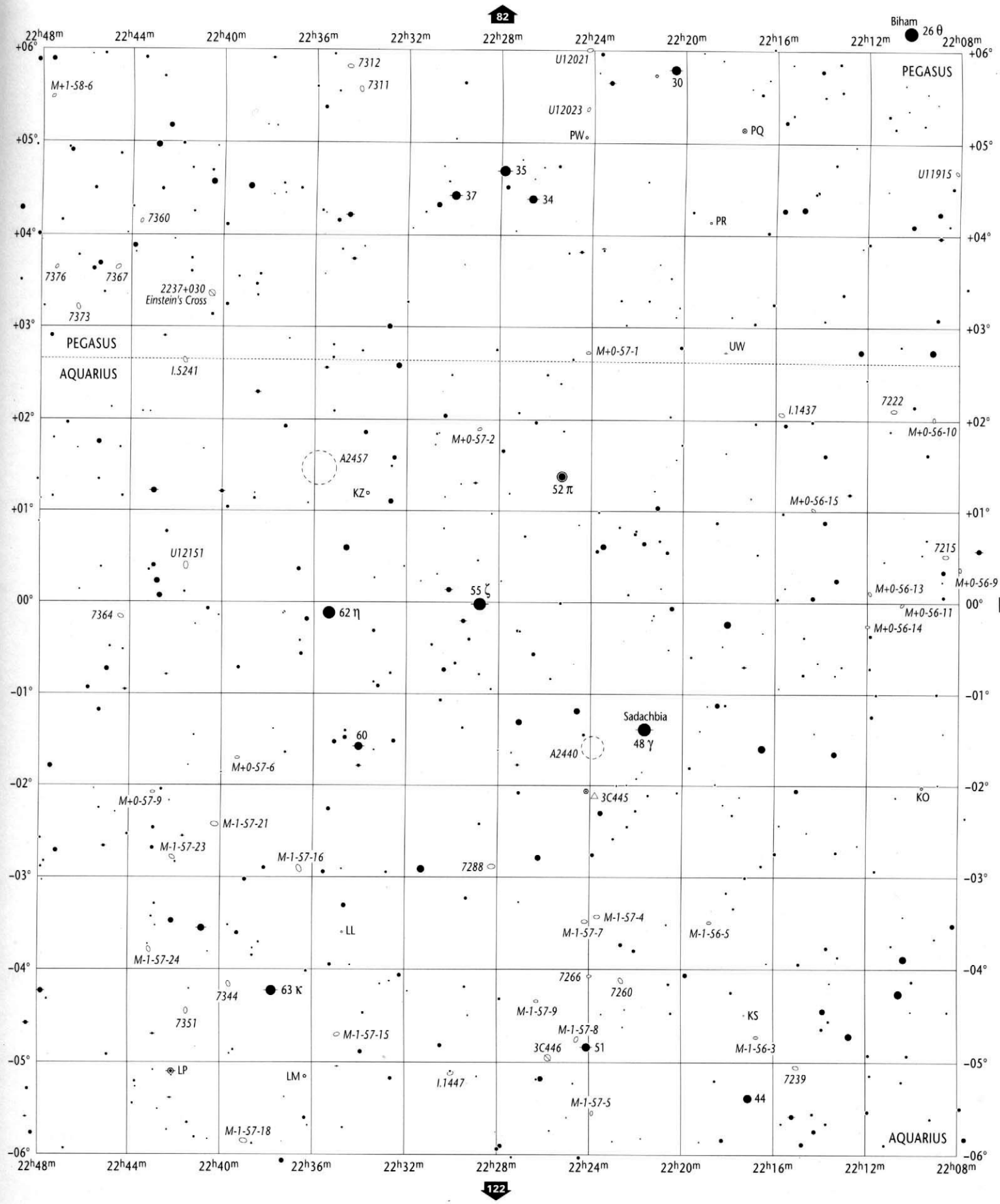

Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30', 30'-10', 10'-5', < 5'	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

22h08m to 23h28m
+06° to -06°

AQR
PSC, PEG

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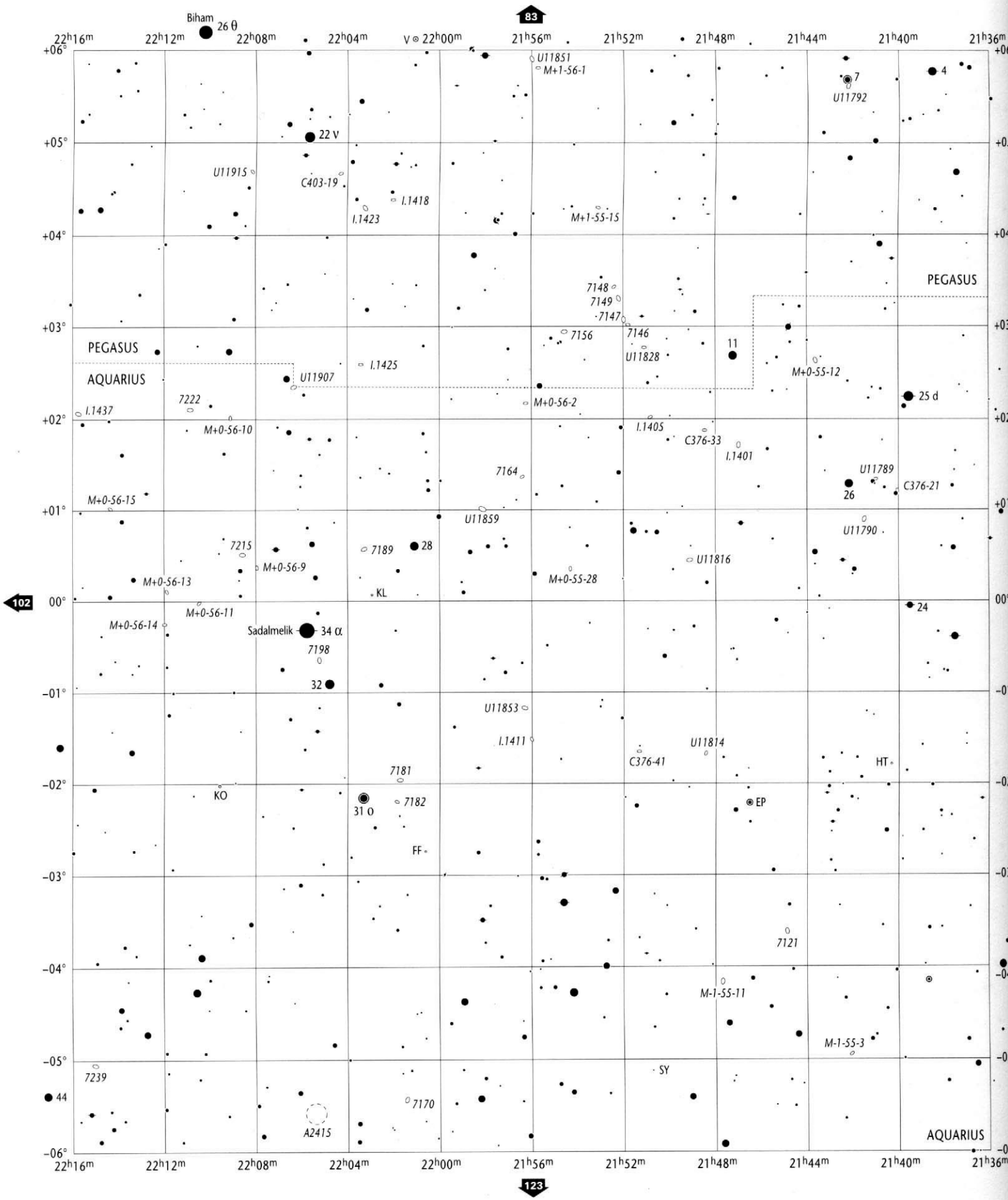

Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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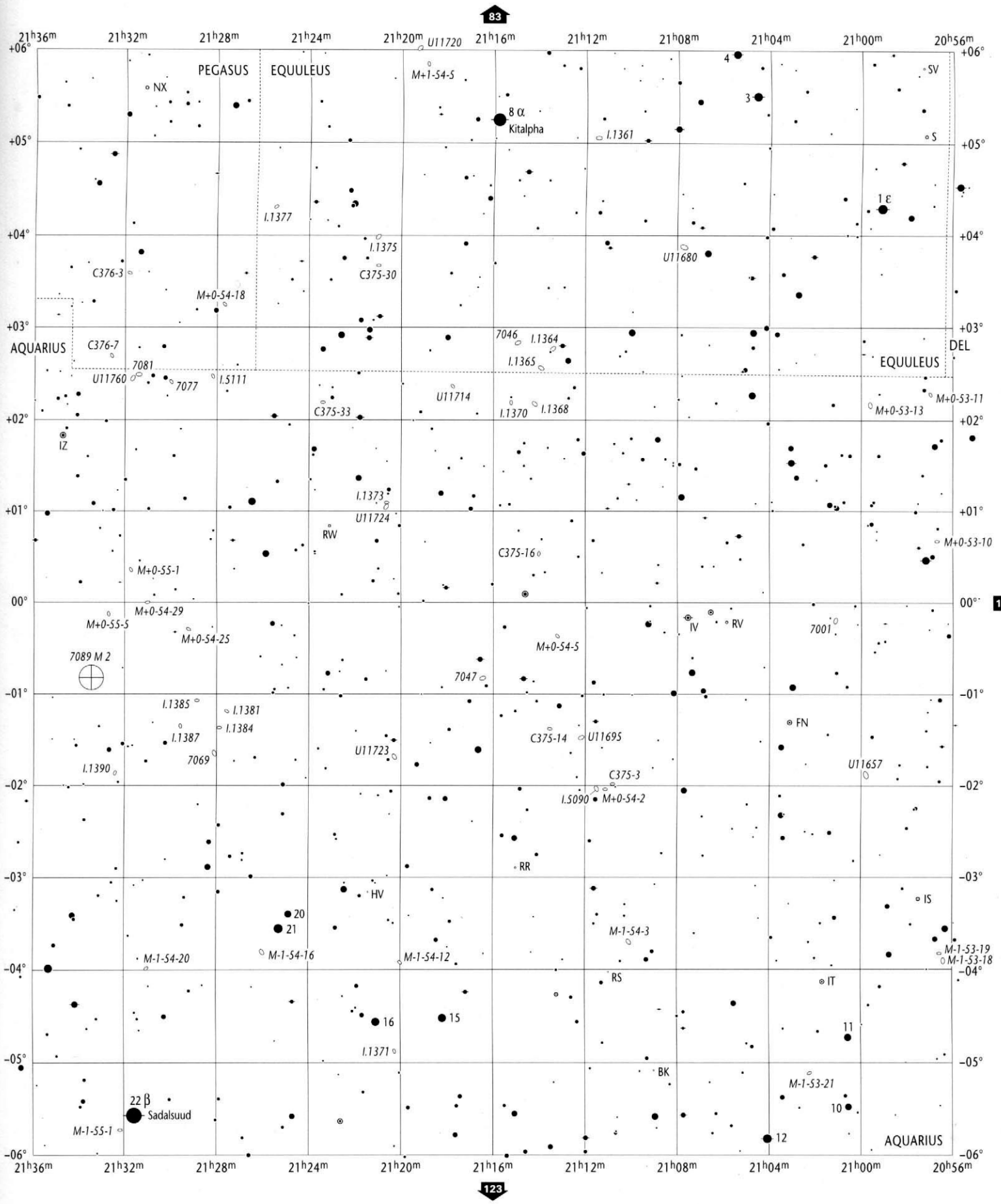

Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale <5'	to scale <5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' <5'	>5' to scale; 5'-2' 2'-1' <1' major axis	to scale

20h56m to 22h16m
+06° to -06°

AQR
PEG, EQU, DEL

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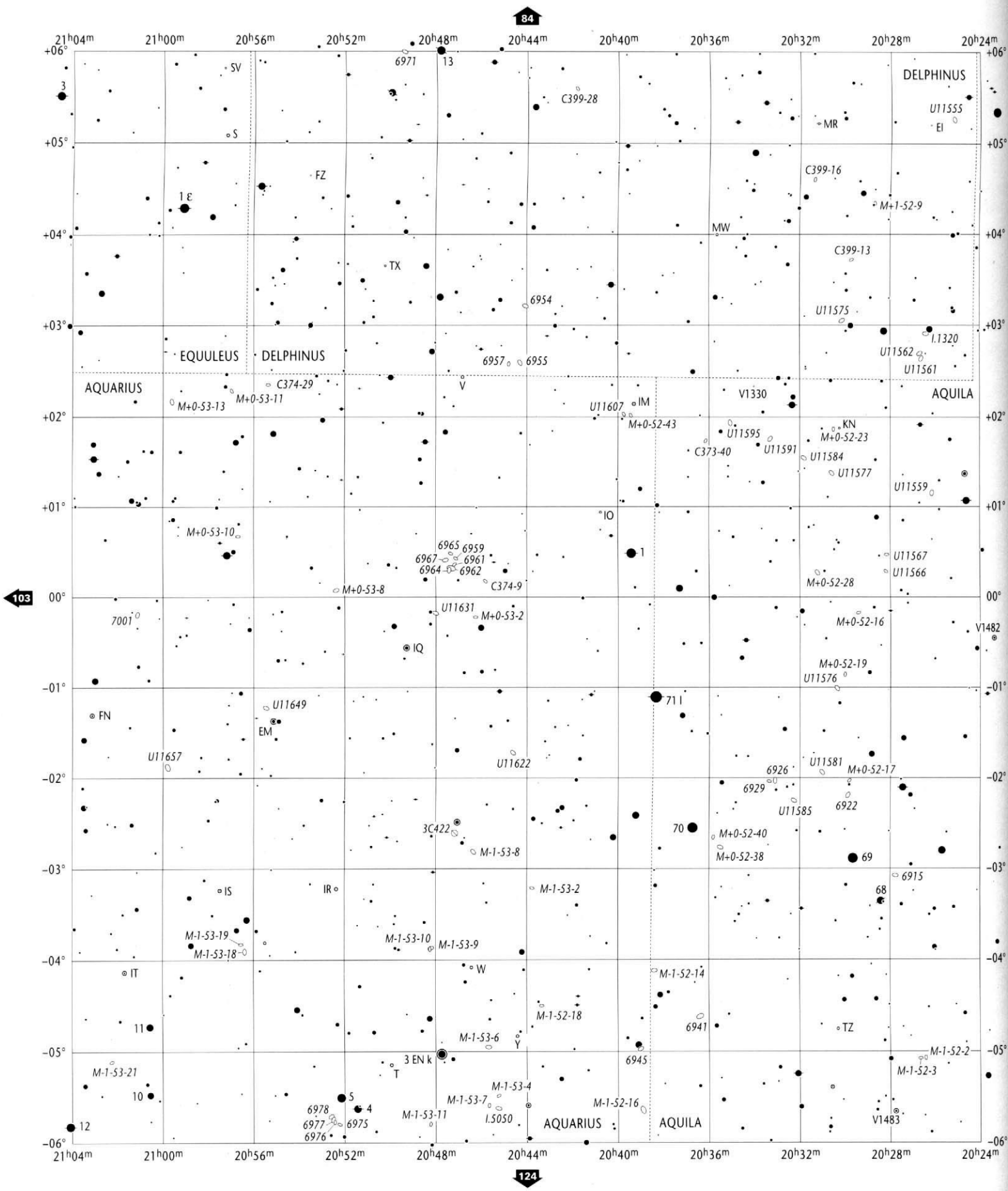

Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less; Amplitude 2.0 mag.; Amplitude 3.0 mag.; Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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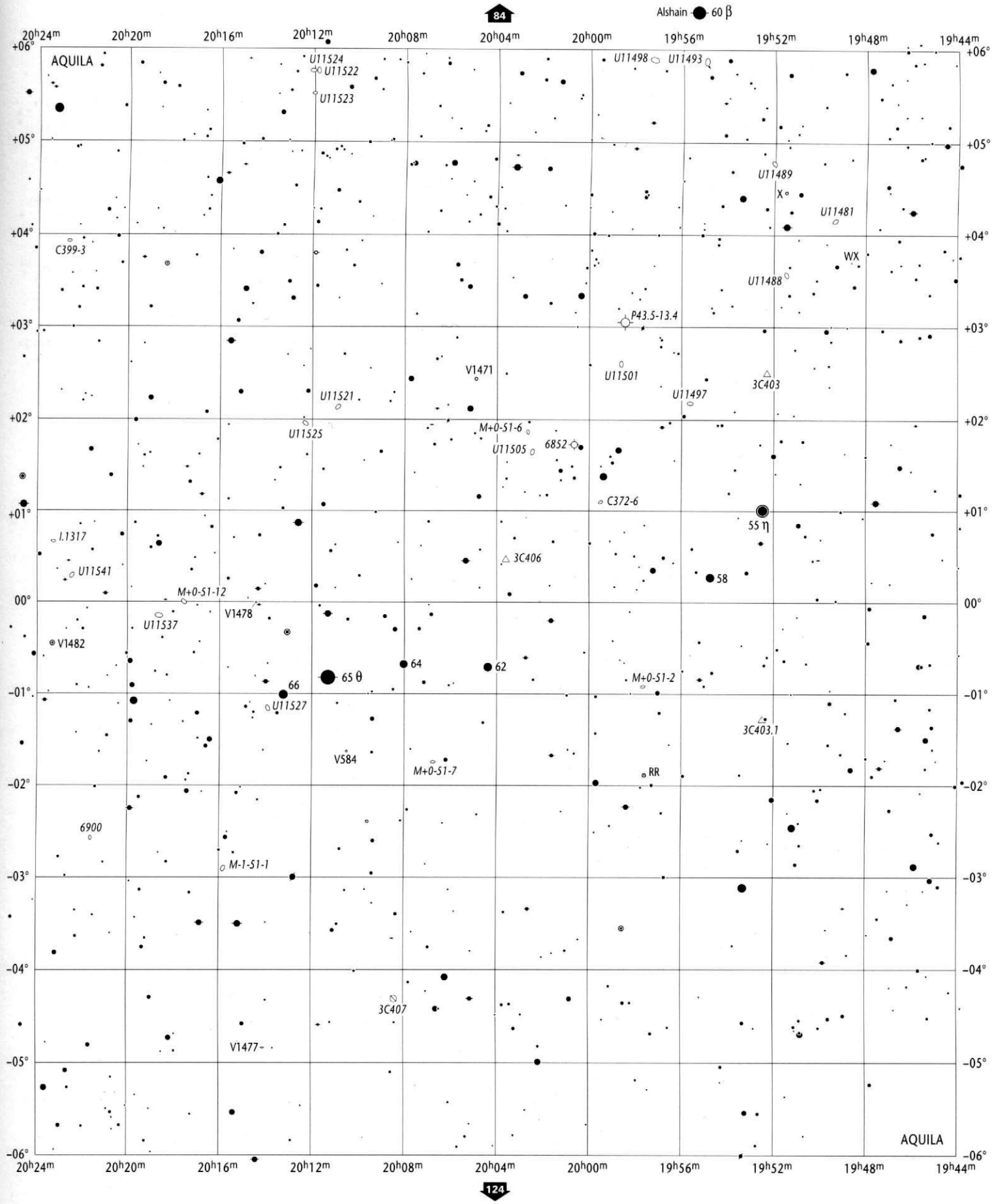
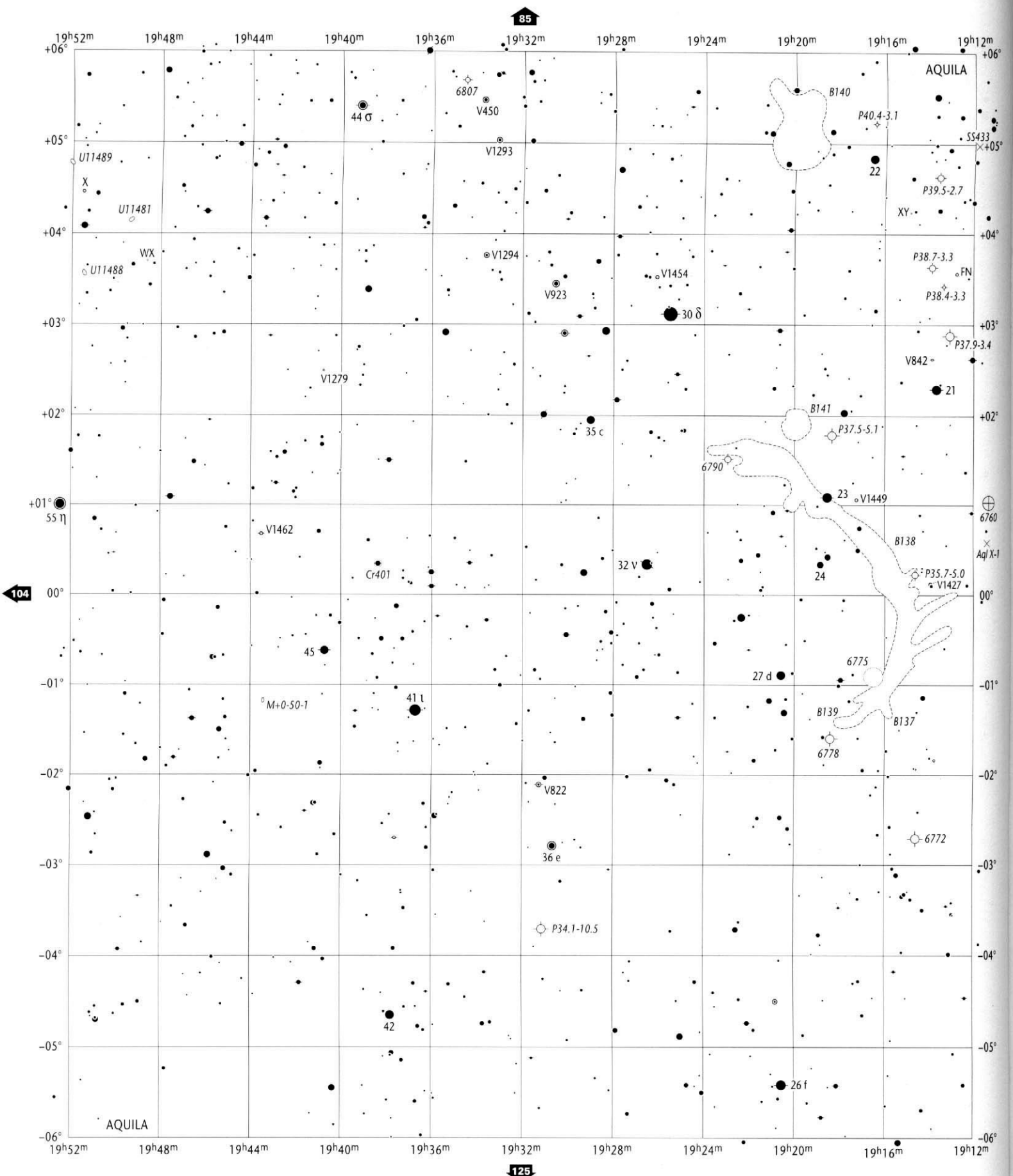


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

19h44m to 21h04m
+06° to -06°

AQL
AQR, DEL, EQU

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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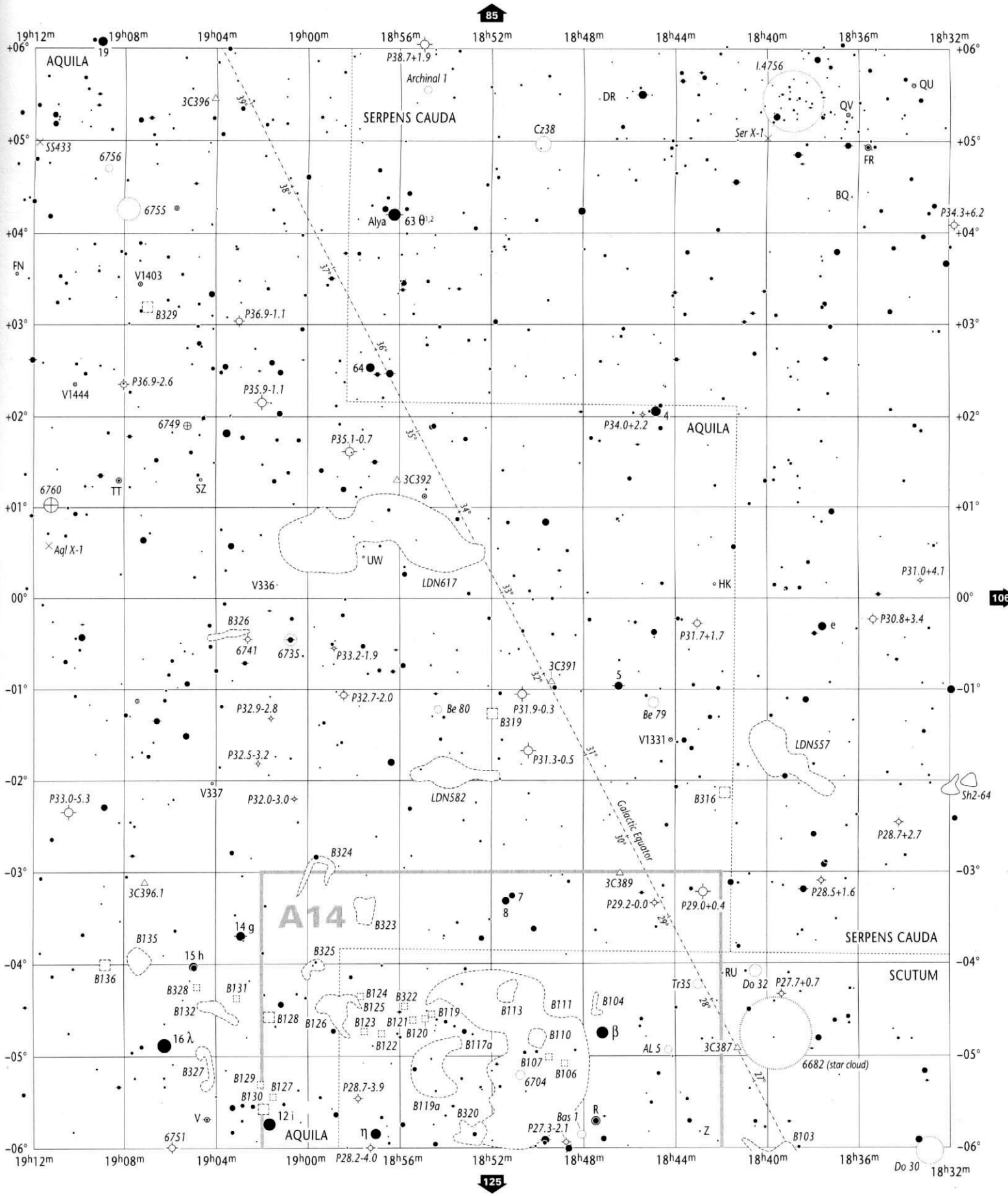
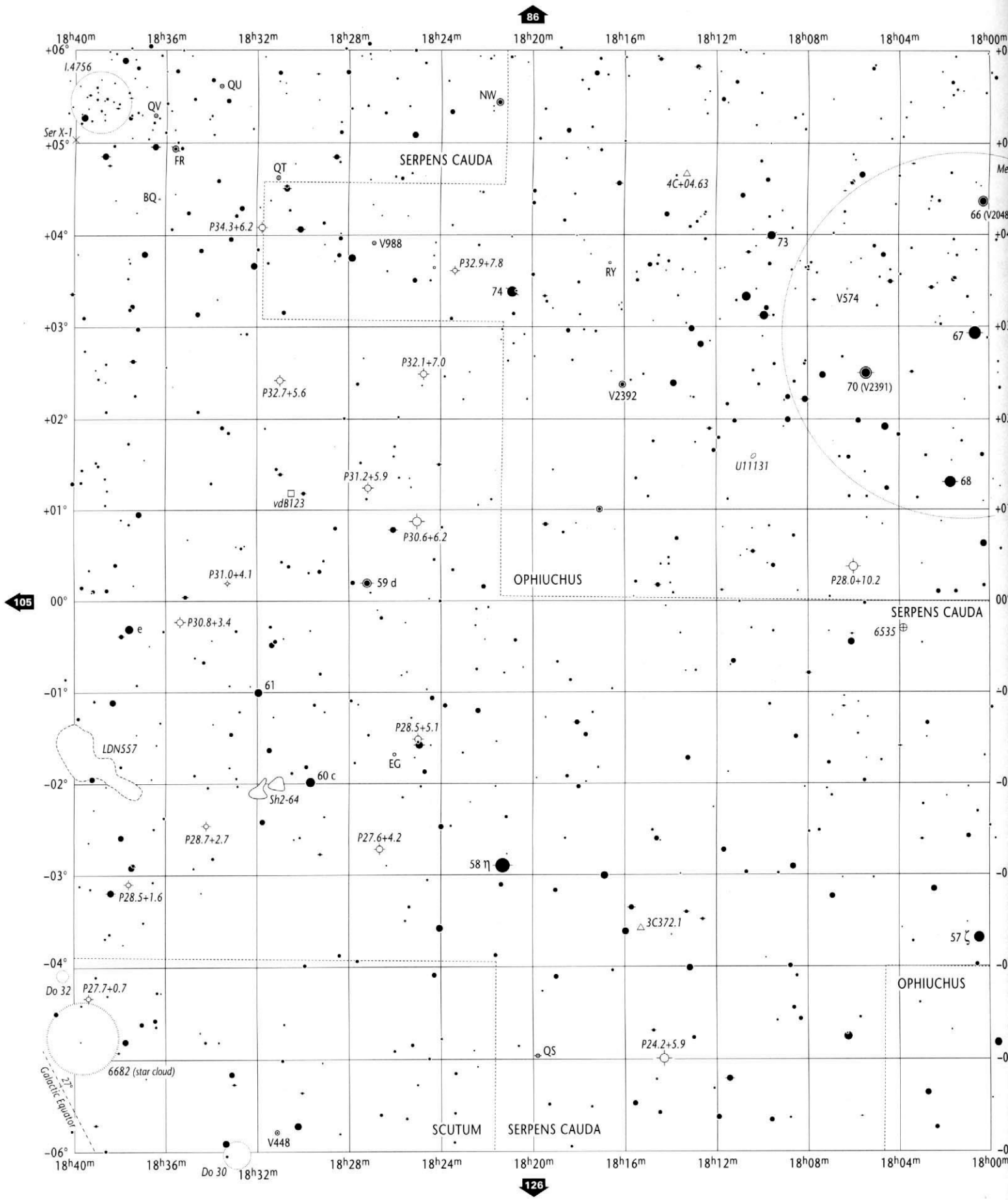


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	18^h32^m to 19^h52^m +06° to −06°	AQL SER, SCT
to scale <5'	to scale <5'	>30" 30"-10" 10"-5" <5"	to scale 10'-5' <5'	>5' to scale; 5'-2' 2'-1' <1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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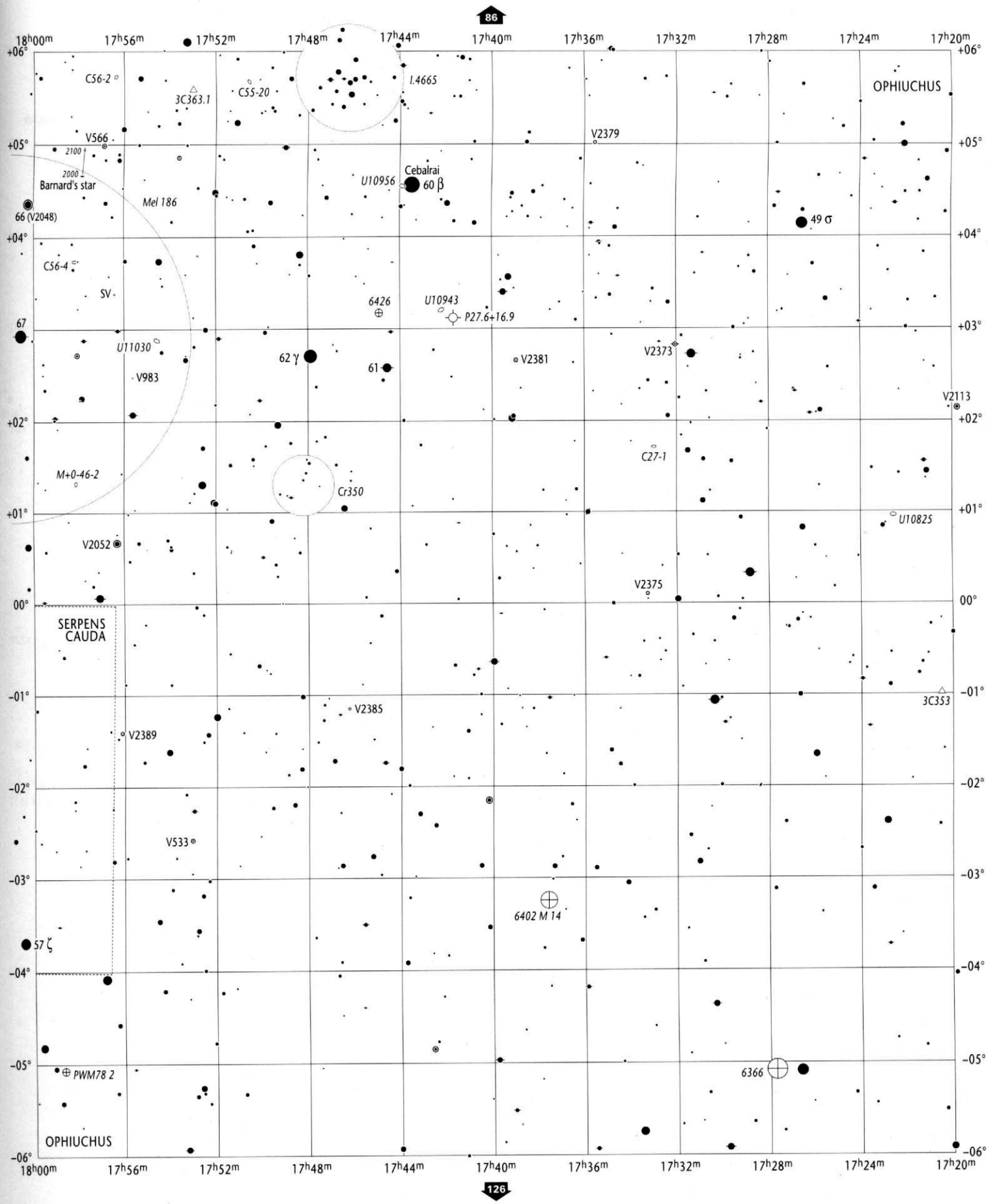
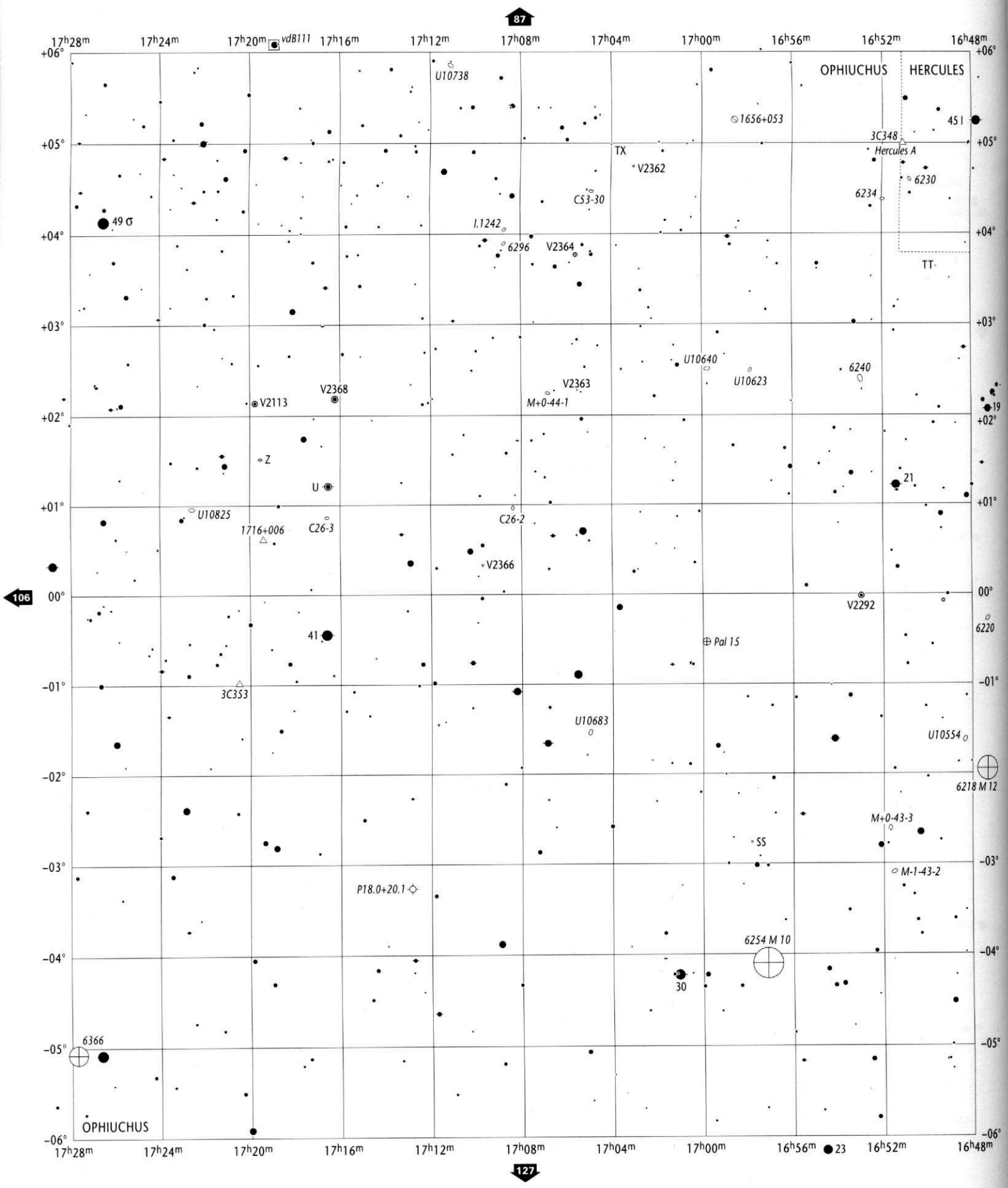


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	**17h20m to 18h40m +06° to −06°**	**OPH** SER, SCT

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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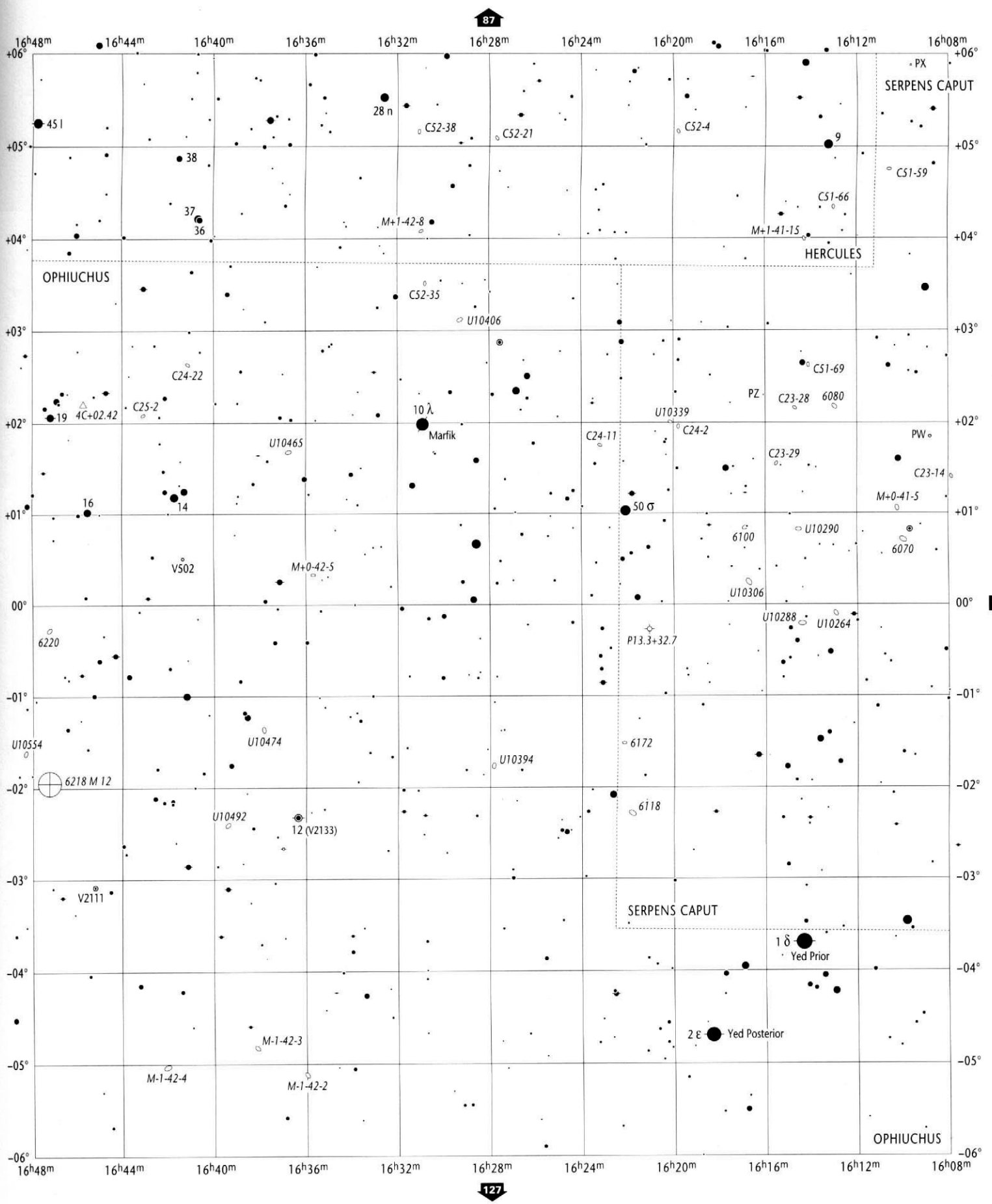


Open Star Clusters and Asterisms — to scale, < 5'

Globular Star Clusters — to scale, < 5'

Planetary Nebulae — >30", 30"-10", 10"-5", < 5"

Bright & Dark Nebulae — to scale, 10' - 5', < 5'

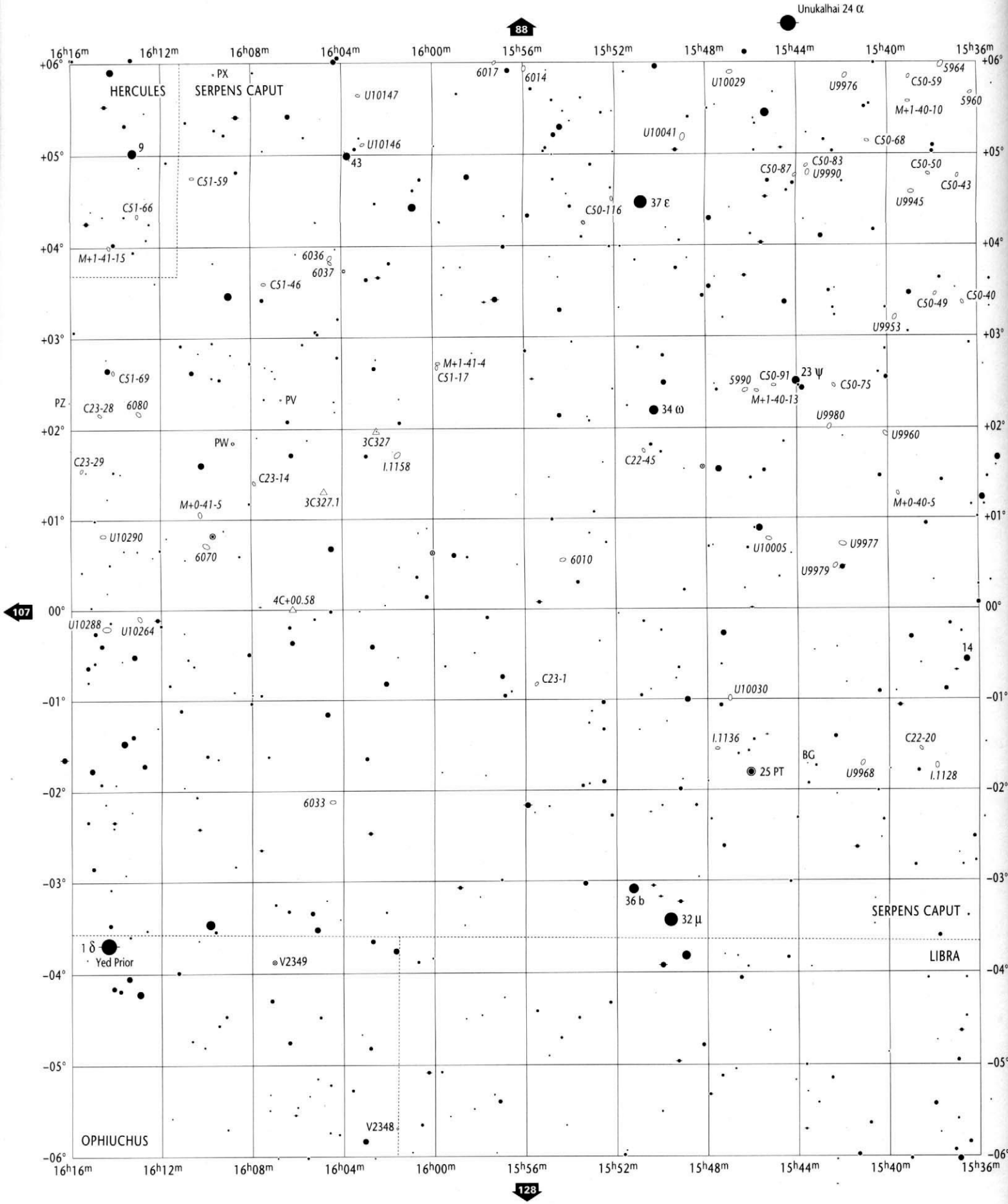
Galaxies — > 5' to scale; 5'-2', 2'-1', < 1' major axis

Galaxy Cluster — to scale

16h08m to 17h28m
+06° to -06°

OPH
SER, HER

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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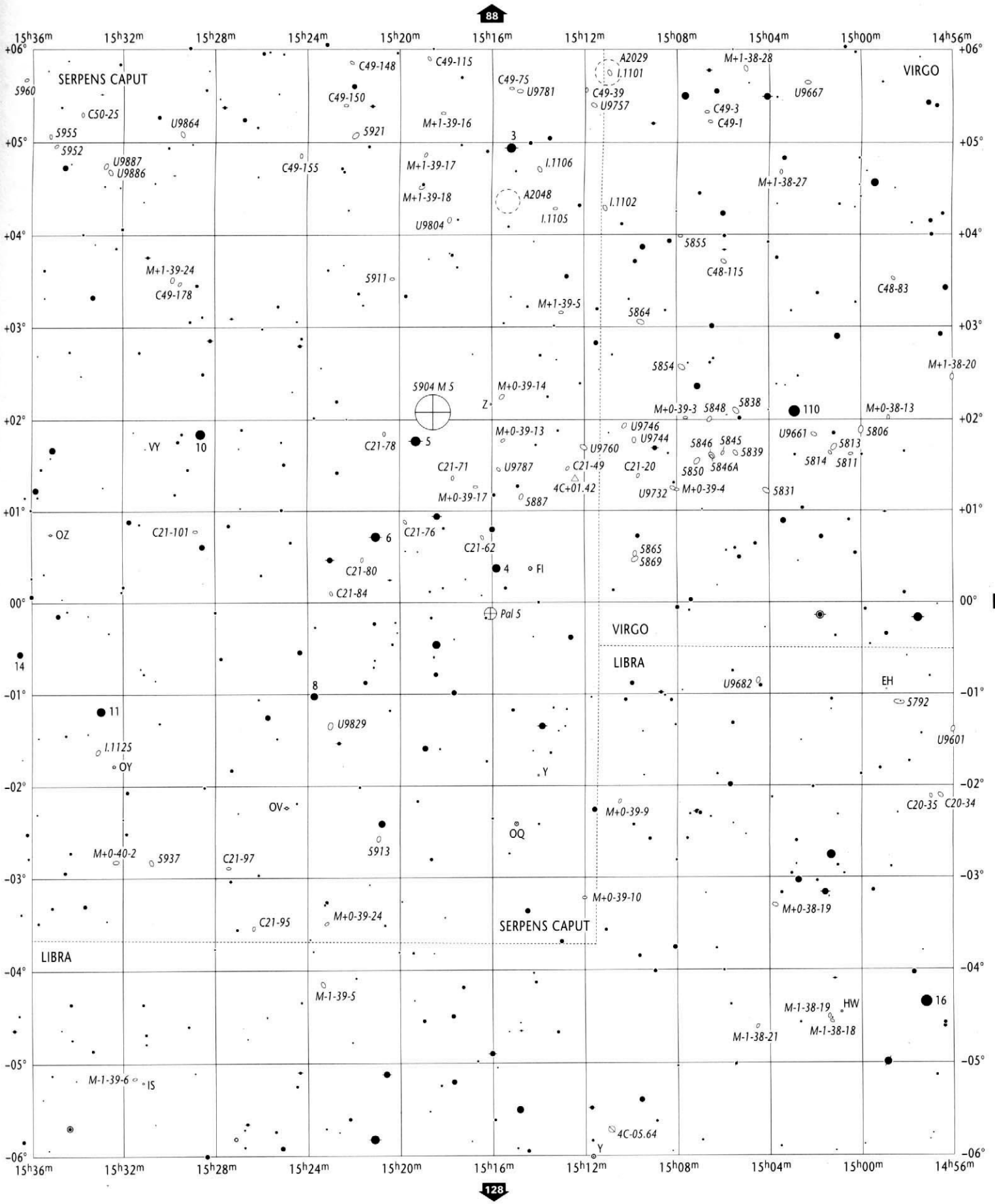
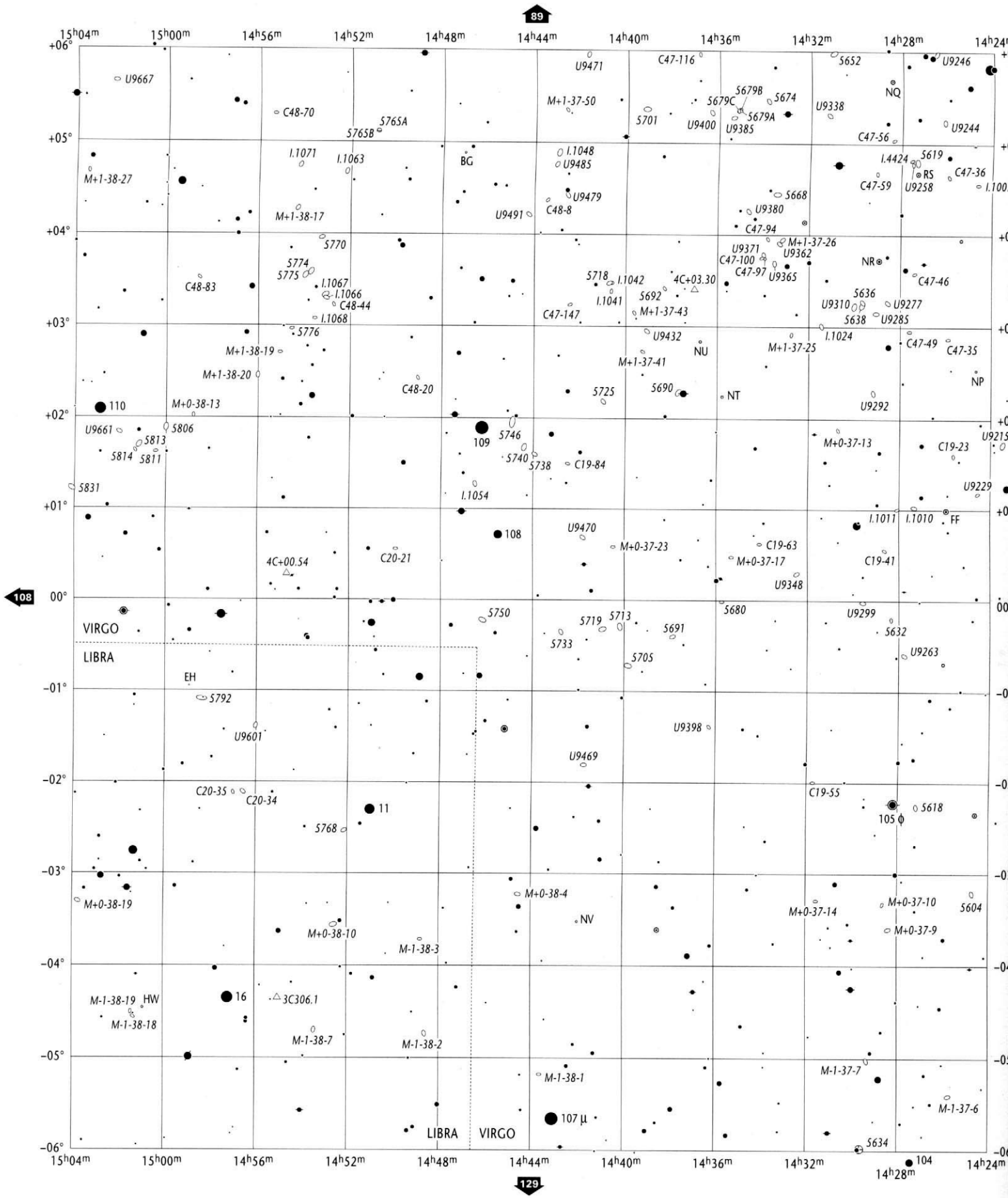


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

14h56m to 16h16m
+06° to -06°

SER
LIB, VIR, OPH, HE

Wil Tirion / Barry Rappaport / Will Rem



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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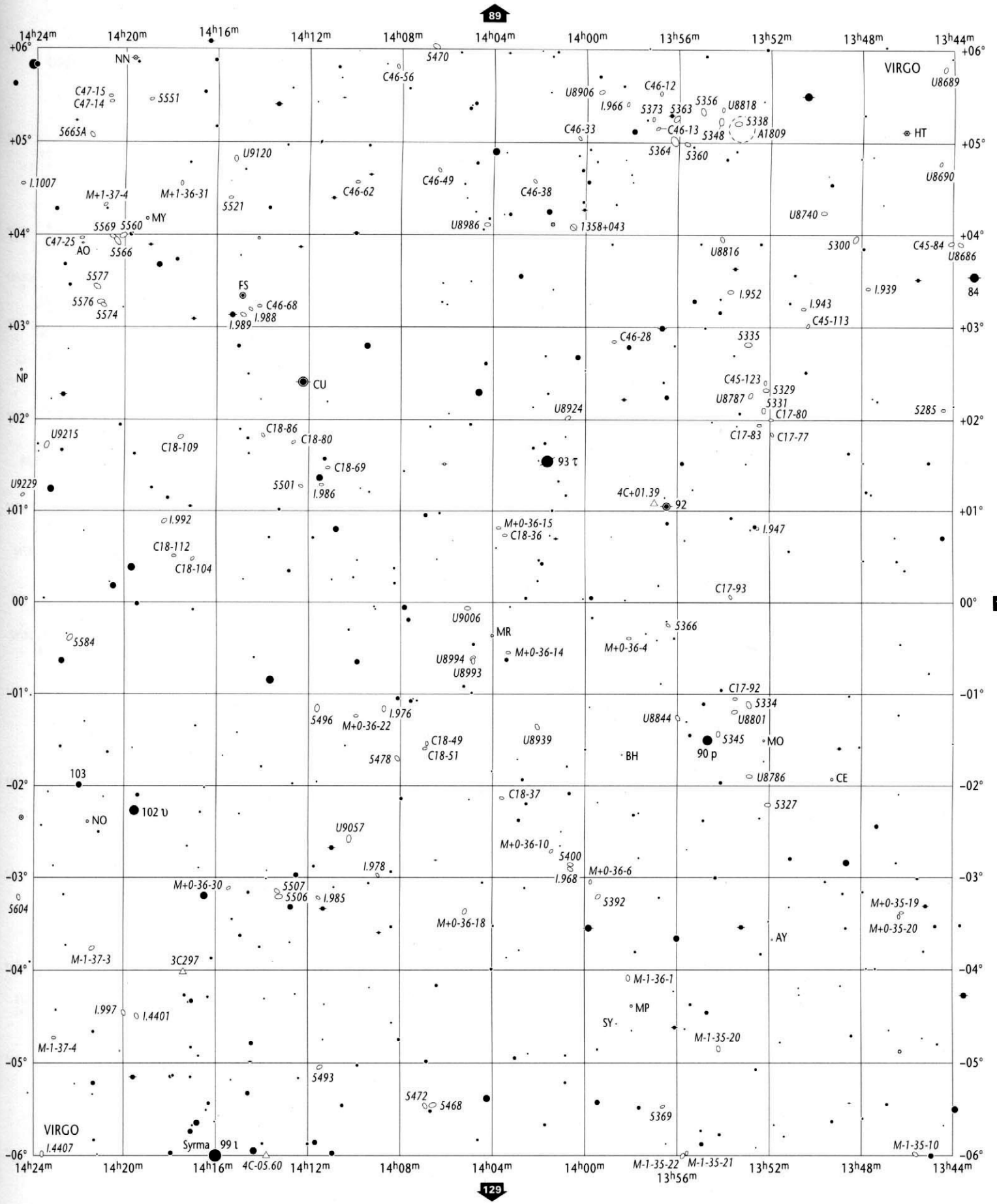
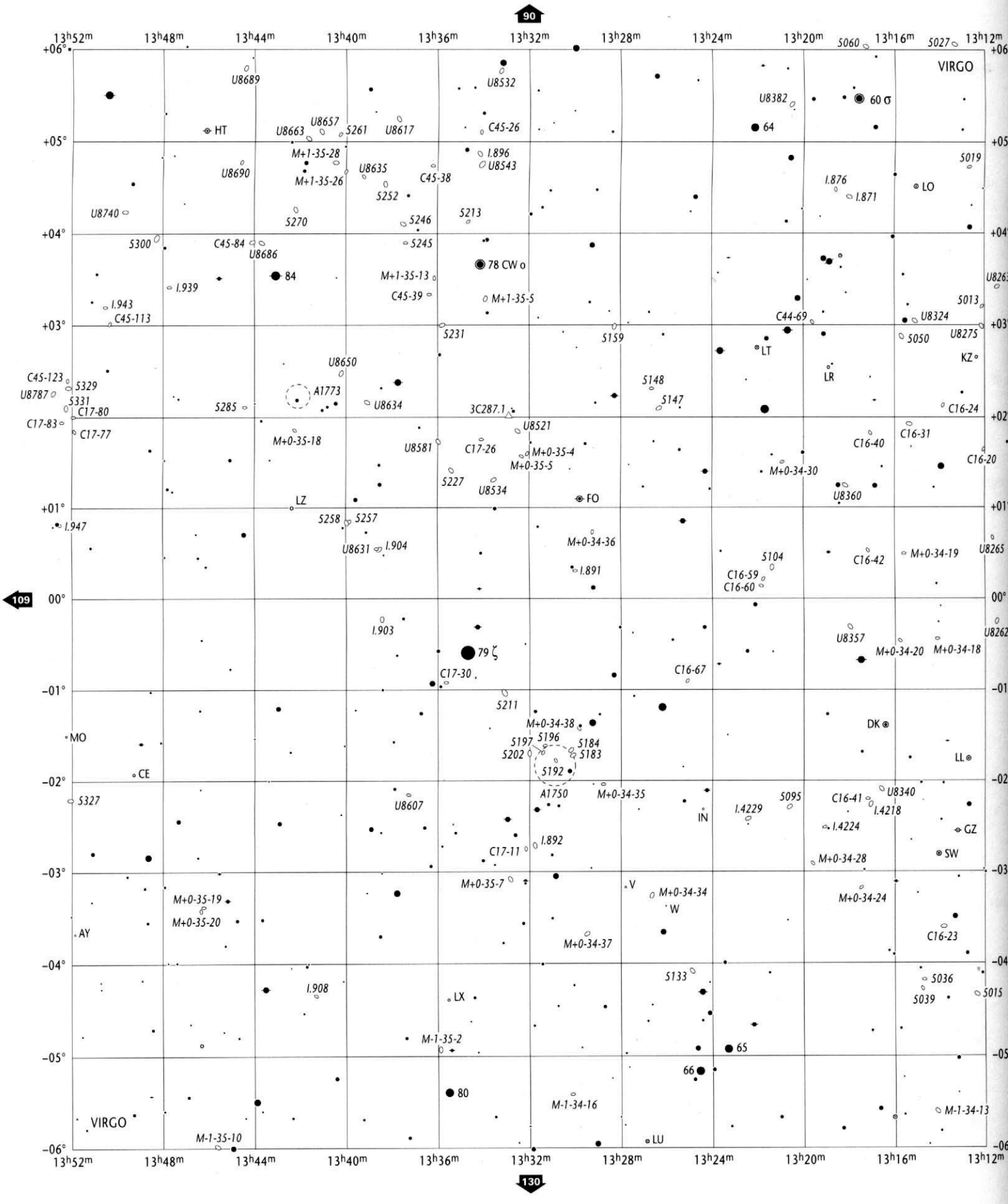


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

13h44m to 15h04m
+06° to -06°

VIR
LIB

Wil Tirion / Barry Rappaport / Will Remaklı



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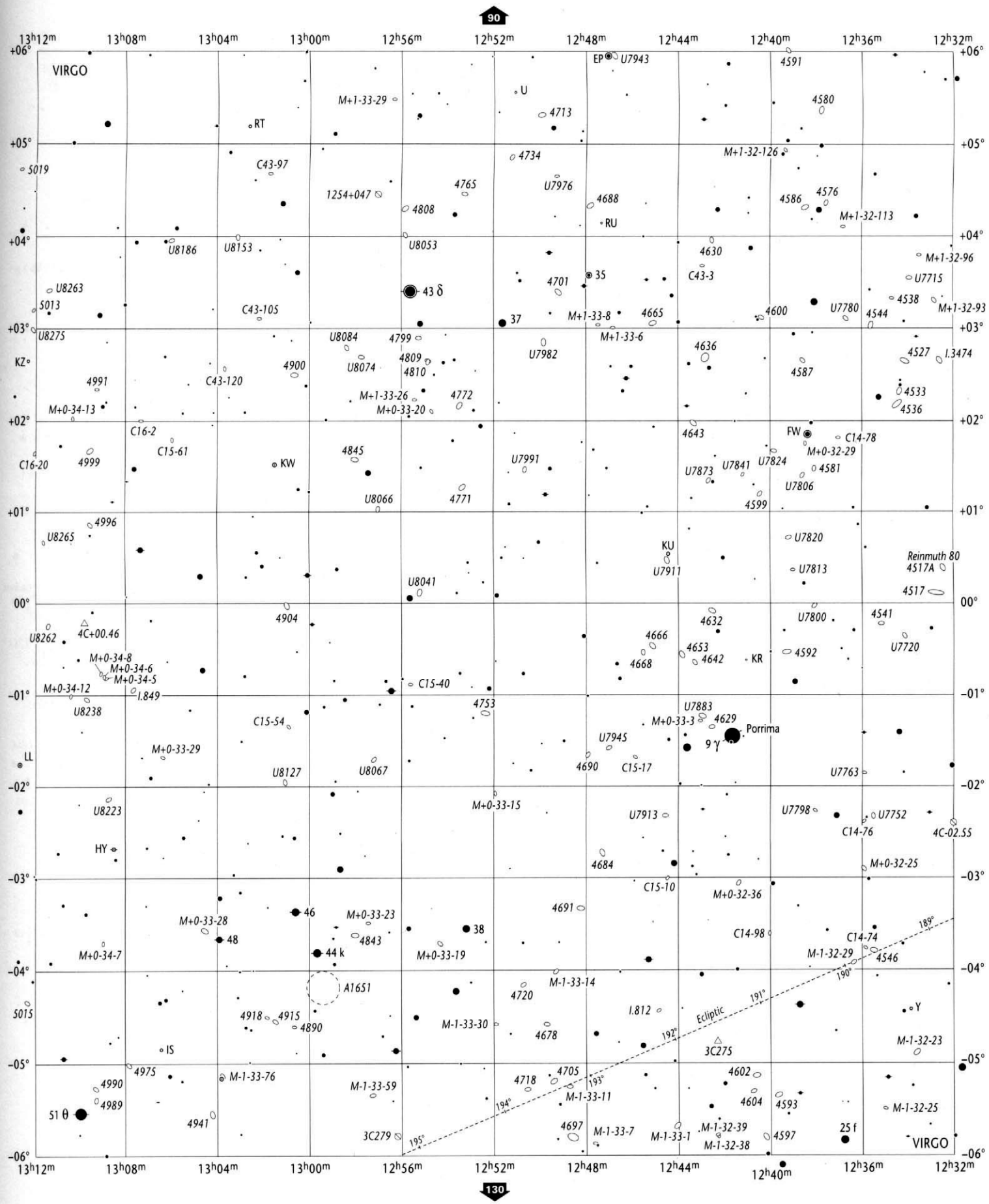


111

Open Star Clusters and Asterisms — to scale, < 5'

Globular Star Clusters — to scale, < 5'

Planetary Nebulae — >30", 30"-10", 10"-5", < 5"

Bright & Dark Nebulae — to scale, 10' - 5', < 5'

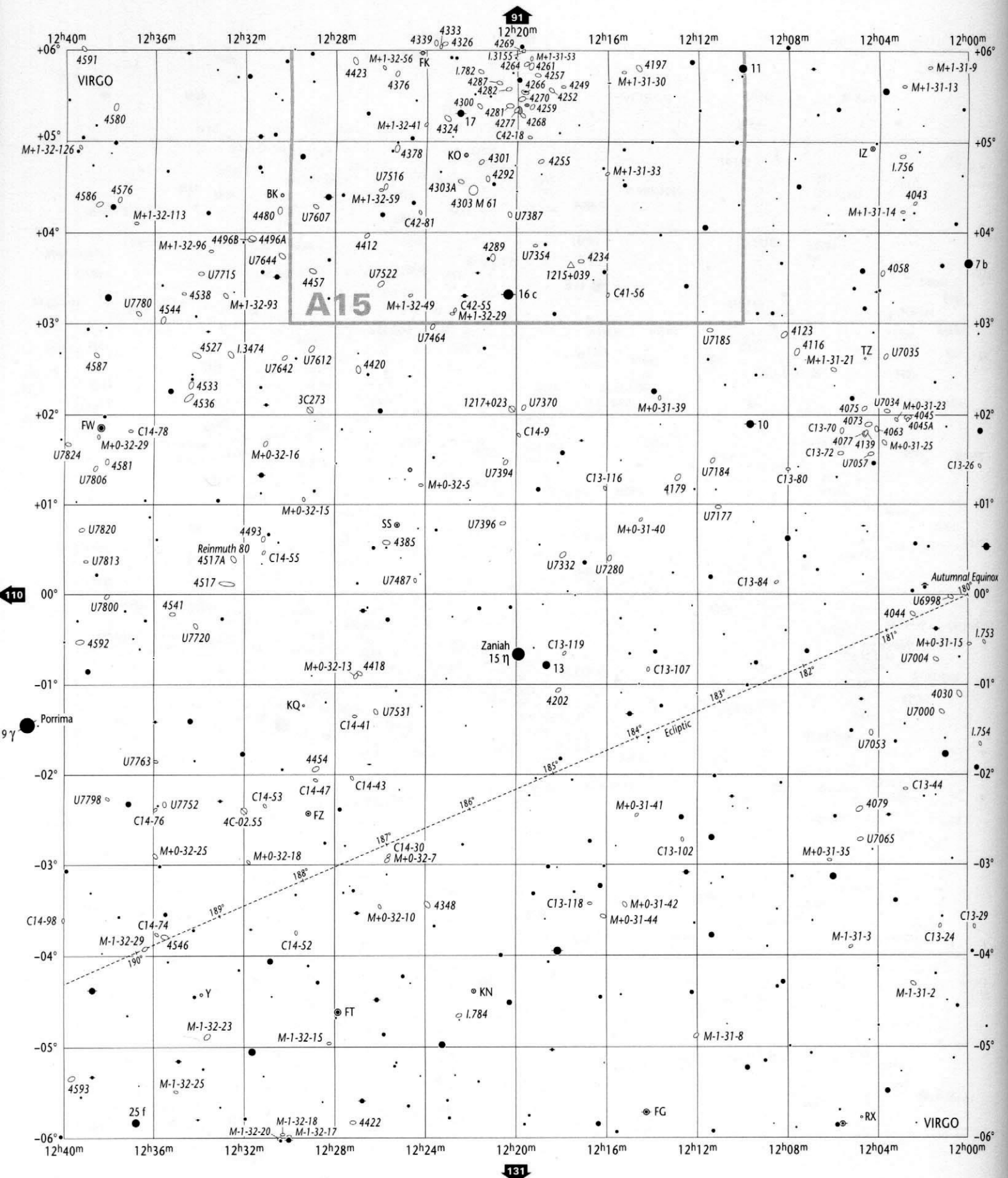
Galaxies — > 5' to scale; 5'-2', 2'-1', < 1' major axis

Galaxy Cluster — to scale

12h32m to 13h52m
+06° to -06°

VIR

Wil Tirion / Barry Rappaport / Will Remaklu



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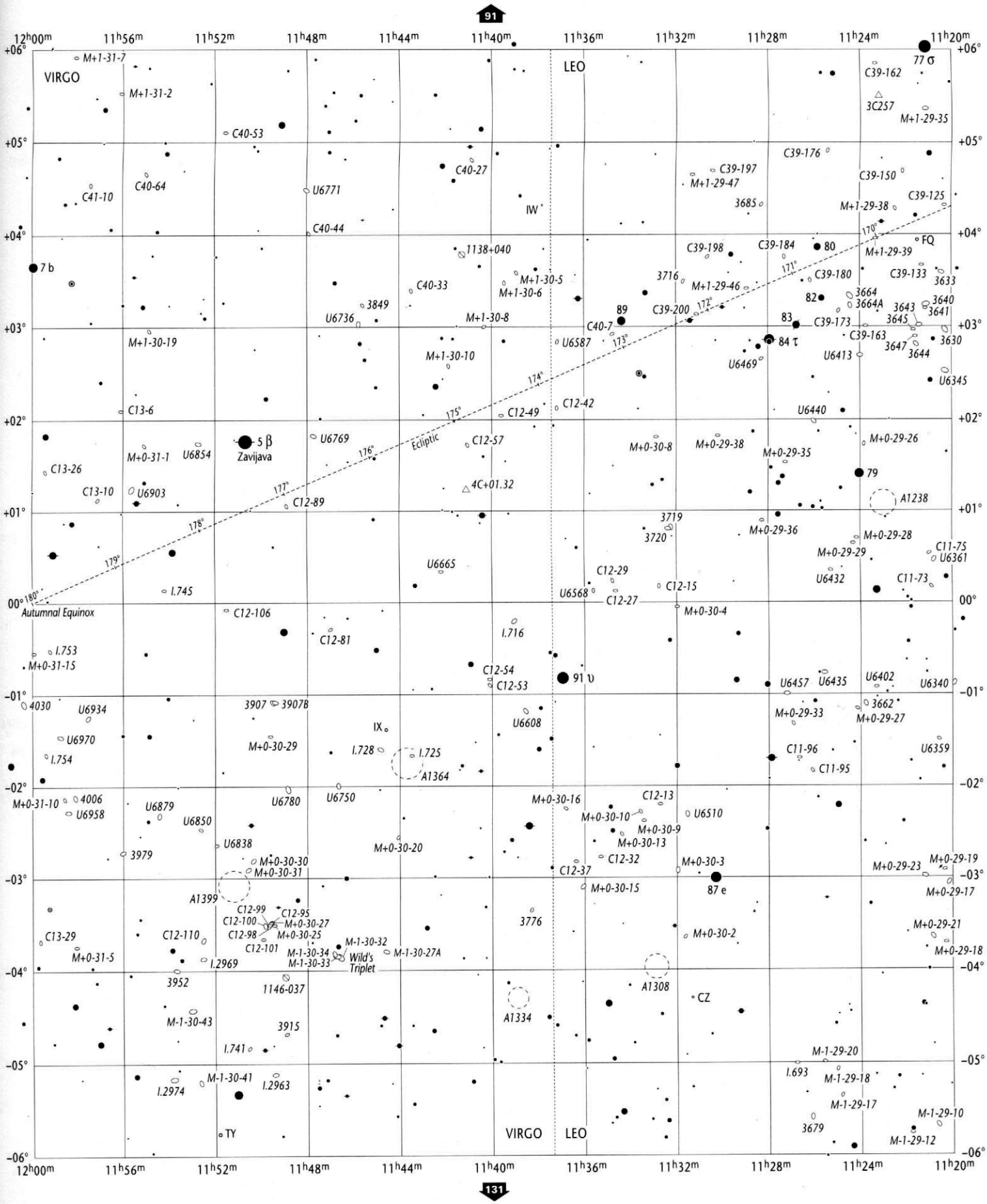


Open Star Clusters and Asterisms — to scale, <5'

Globular Star Clusters — to scale, <5'

Planetary Nebulae — >30", 30"-10", 10"-5", <5"

Bright & Dark Nebulae — to scale, 10'-5', <5'

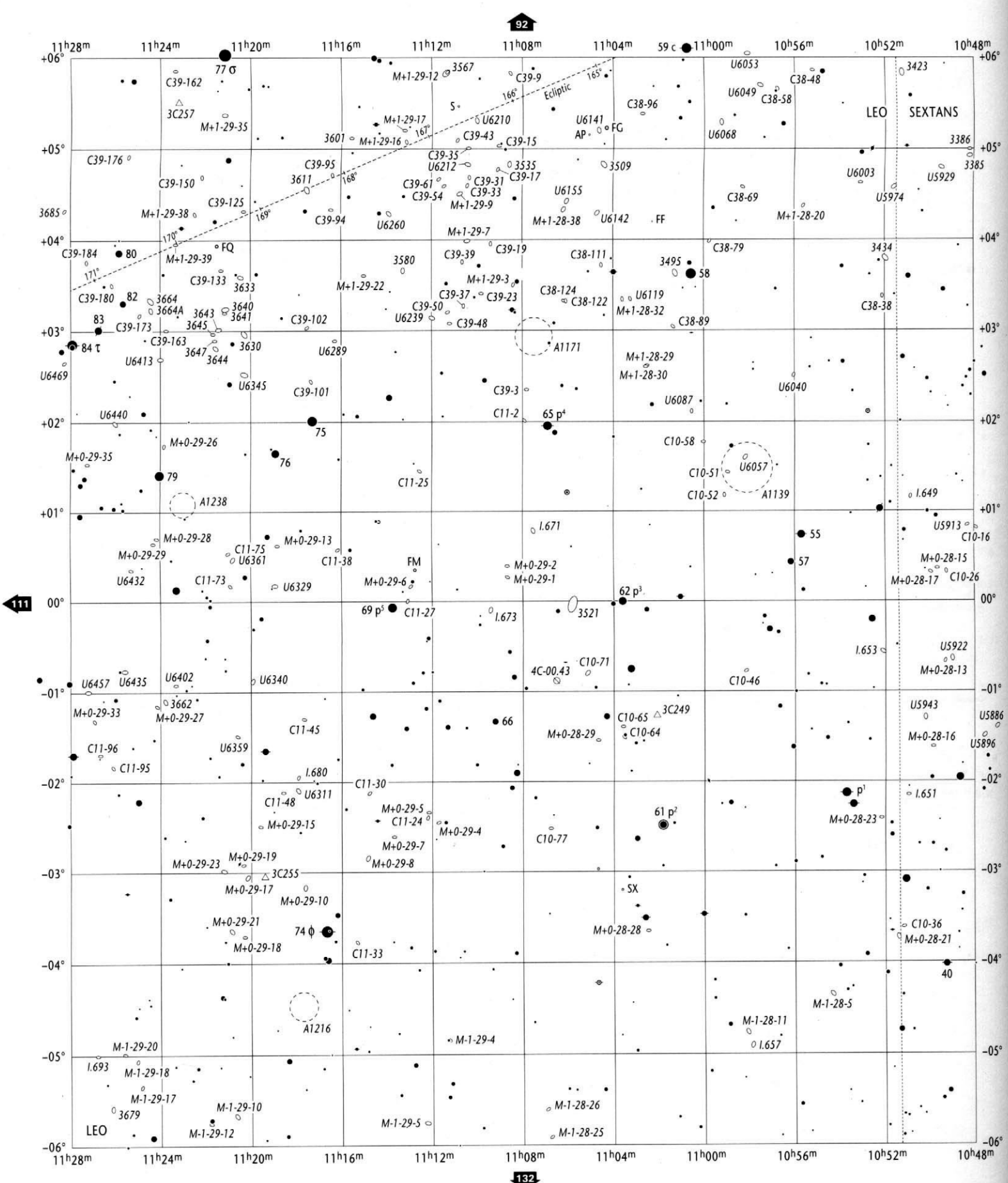
Galaxies — >5' to scale; 5'-2', 2'-1', <1' major axis

Galaxy Cluster — to scale

11h20m to 12h40m
+06° to -06°

VIR
LEO

Wil Tirion / Barry Rappaport / Will Remaki



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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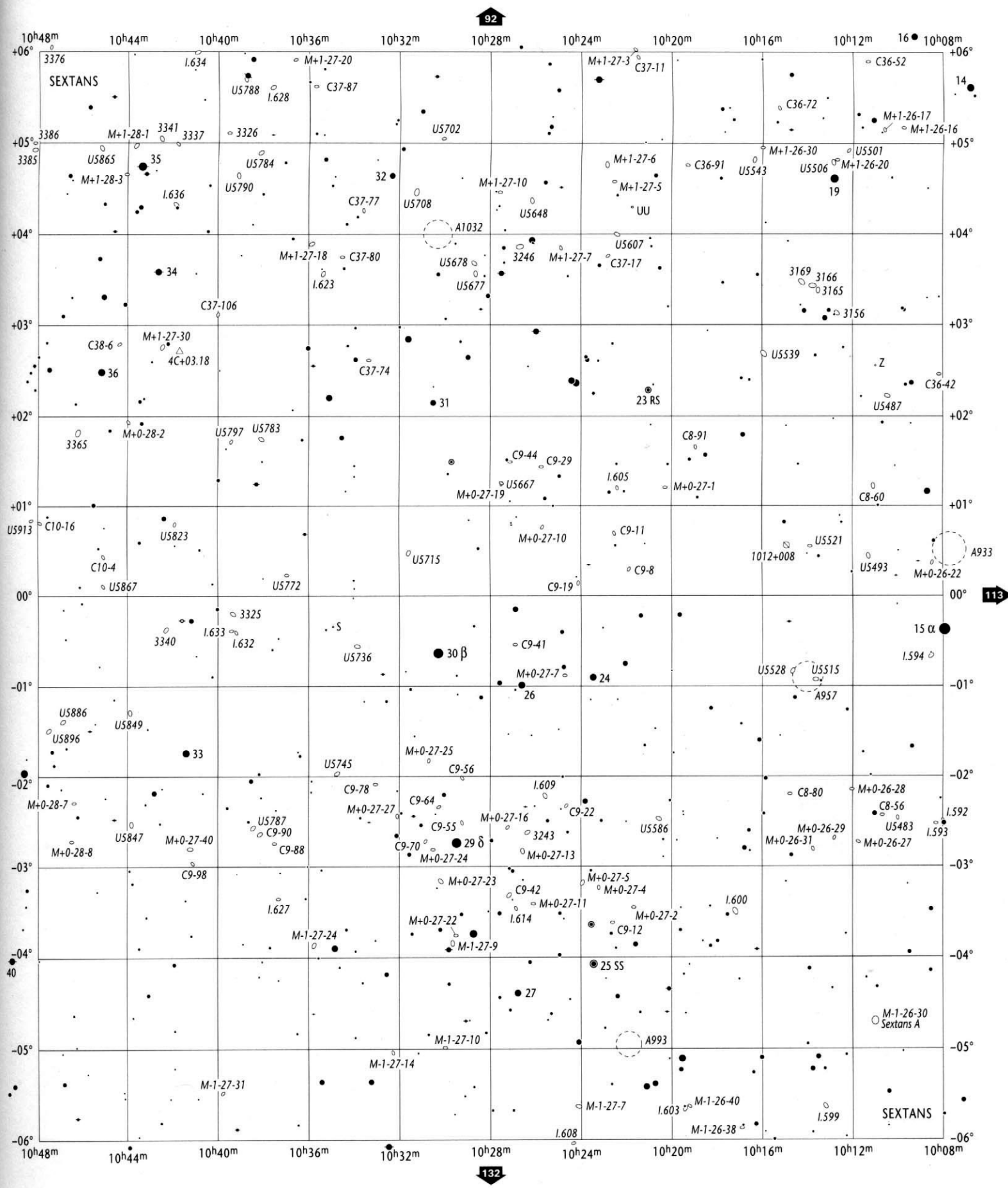
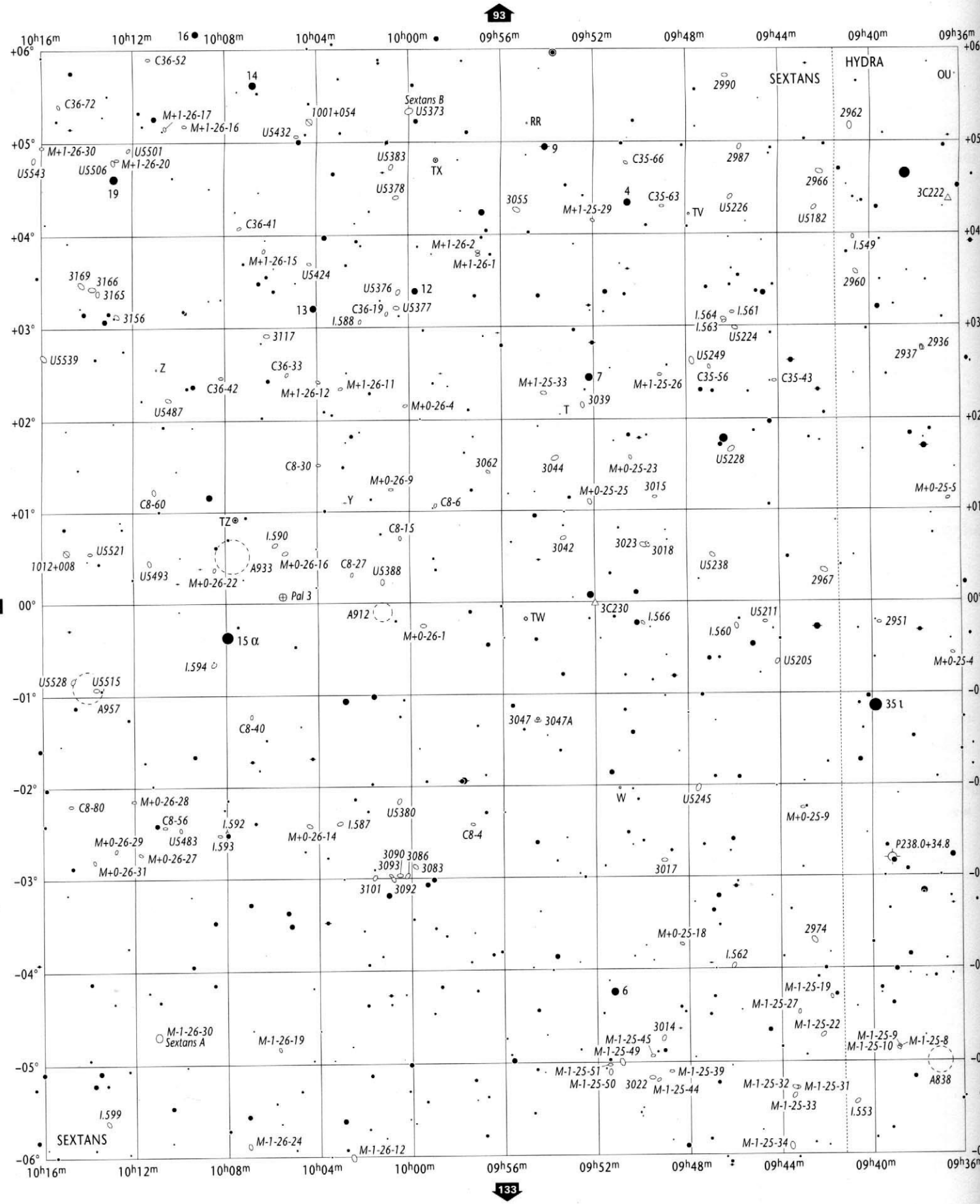


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

10h08m to 11h28m
+06° to -06°

SEX
LEO

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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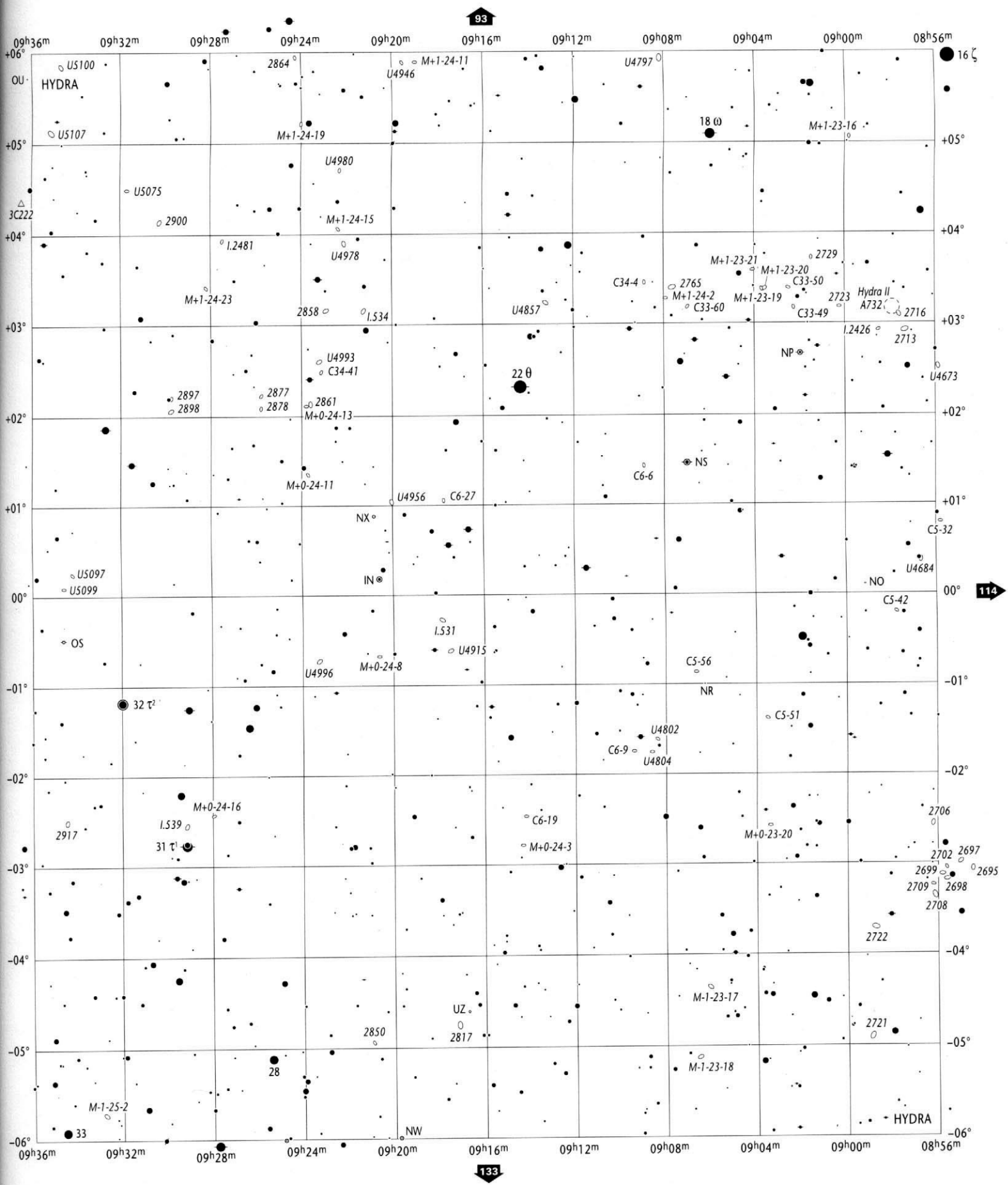
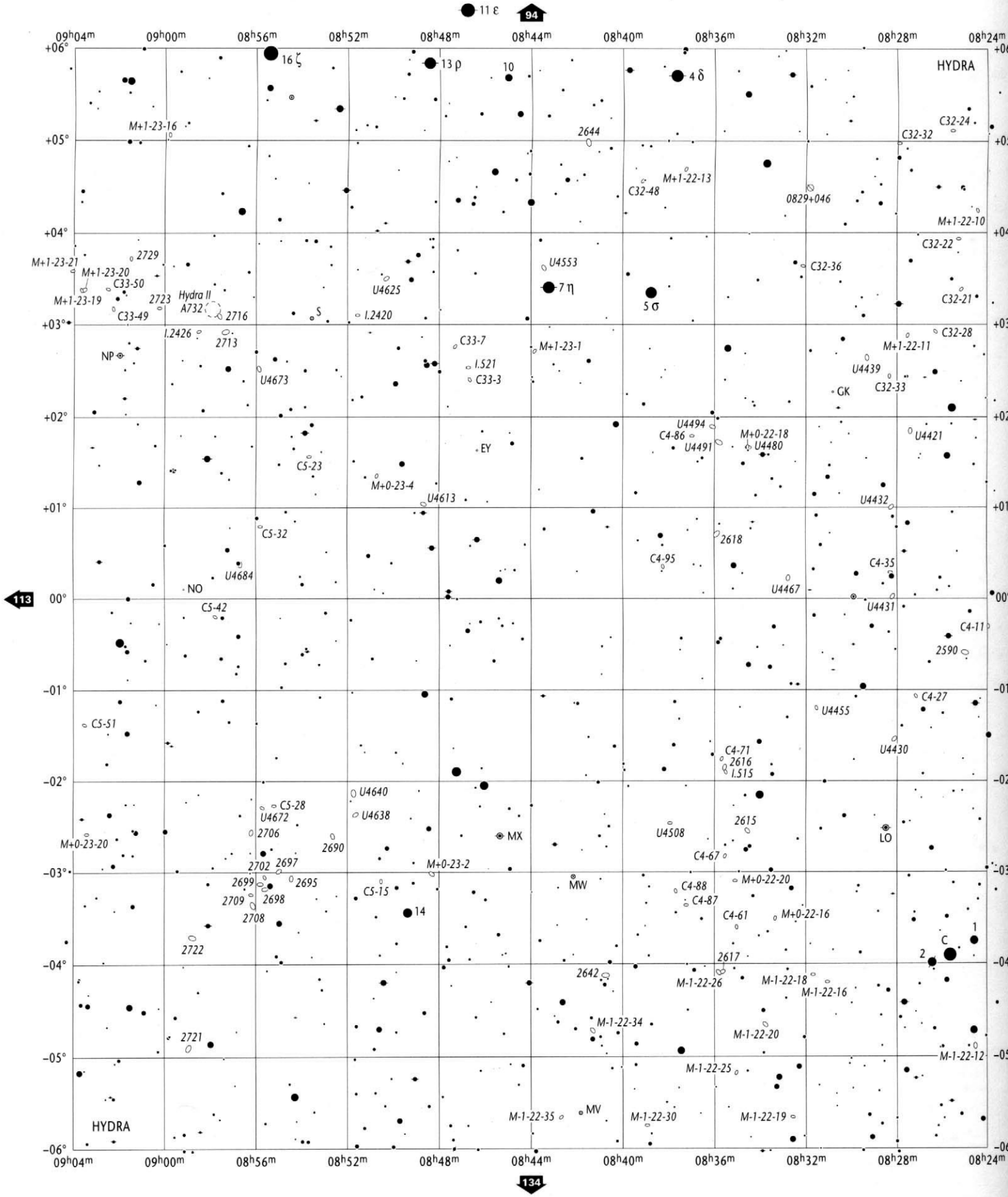


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

08h56m to 10h16m
+06° to −06°

HYA
SEX

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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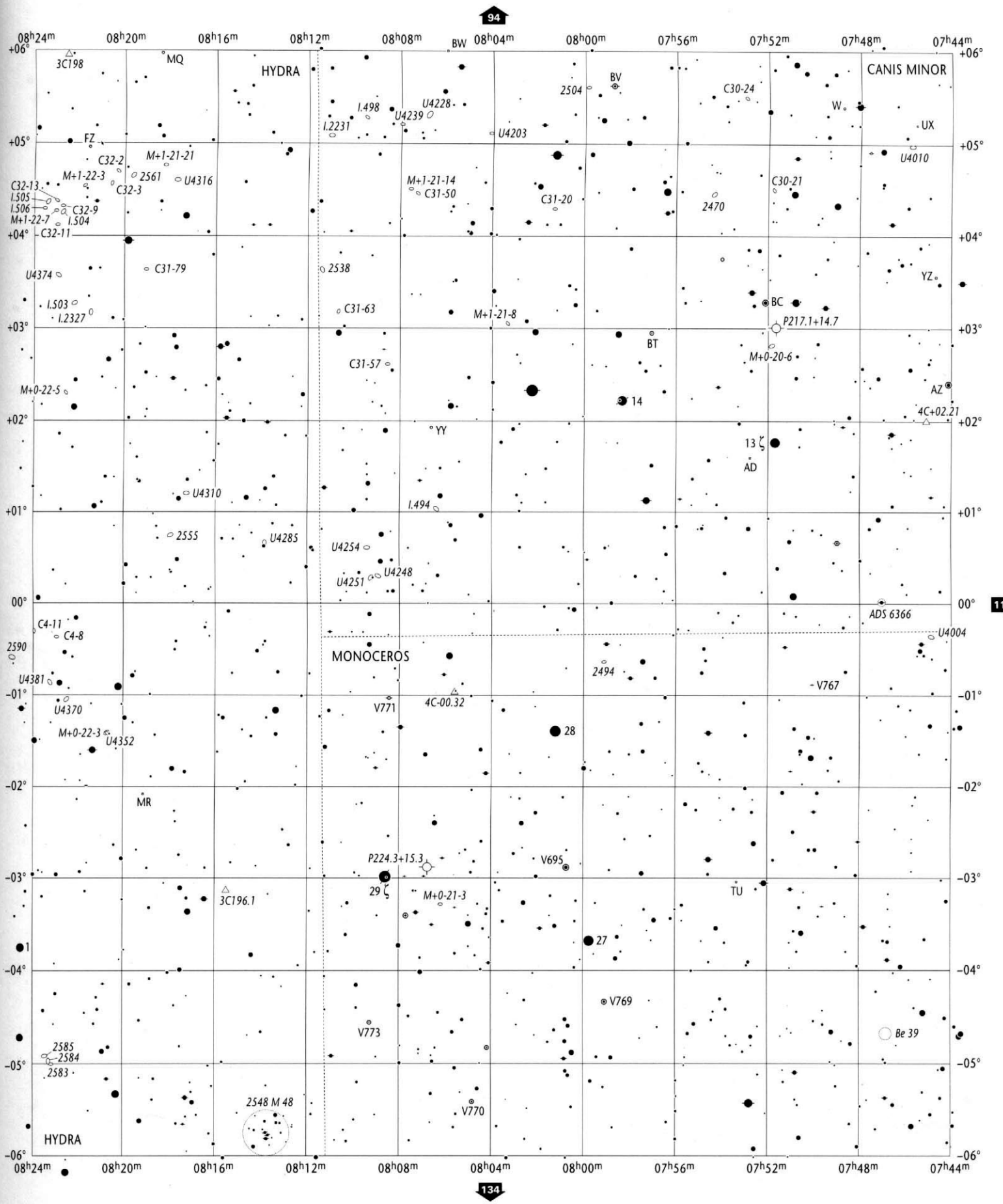
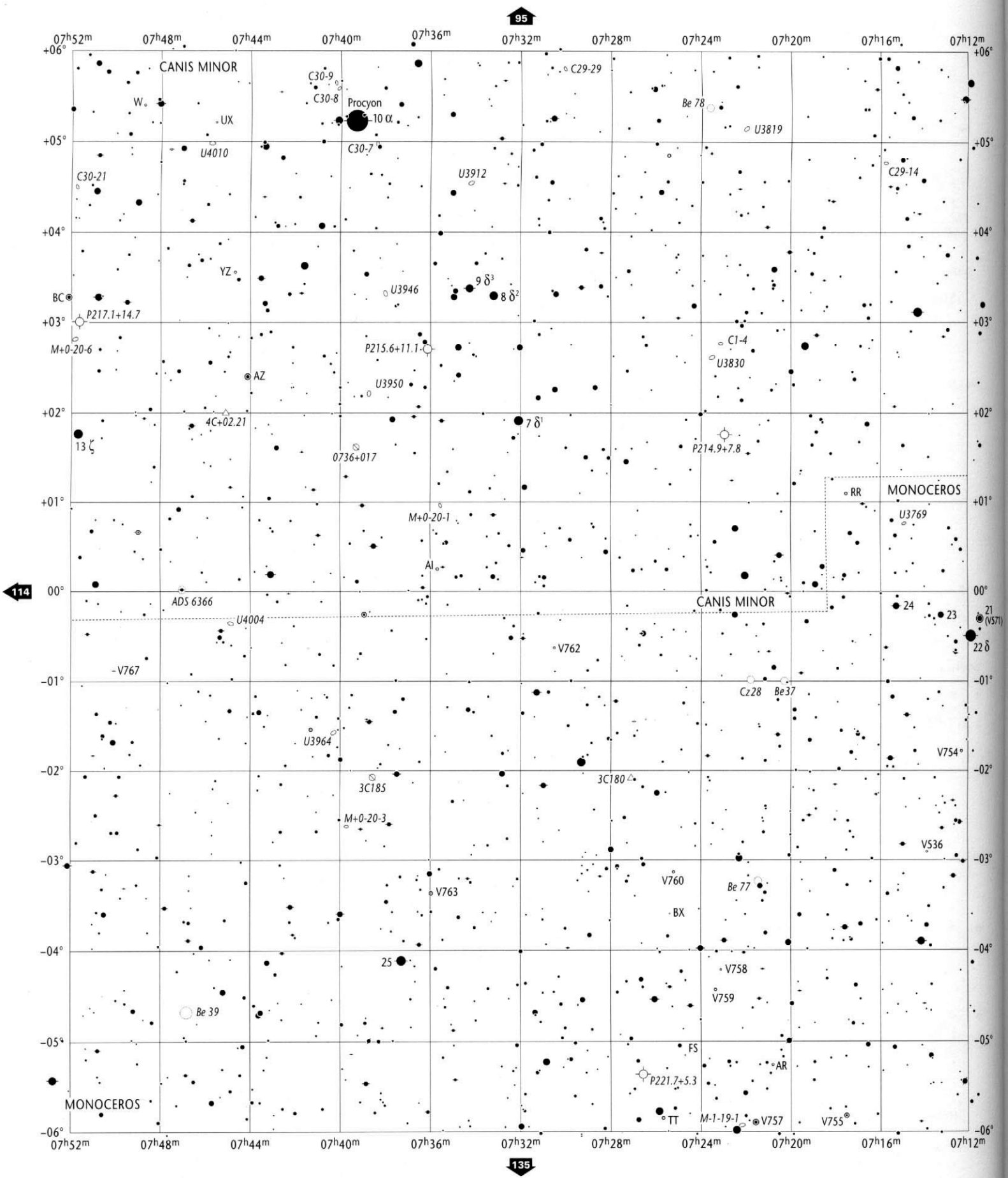


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30' 30'-10' 10'-5' < 5'	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

07h44m to 09h04m
+06° to -06°

HYA
CMI, MON

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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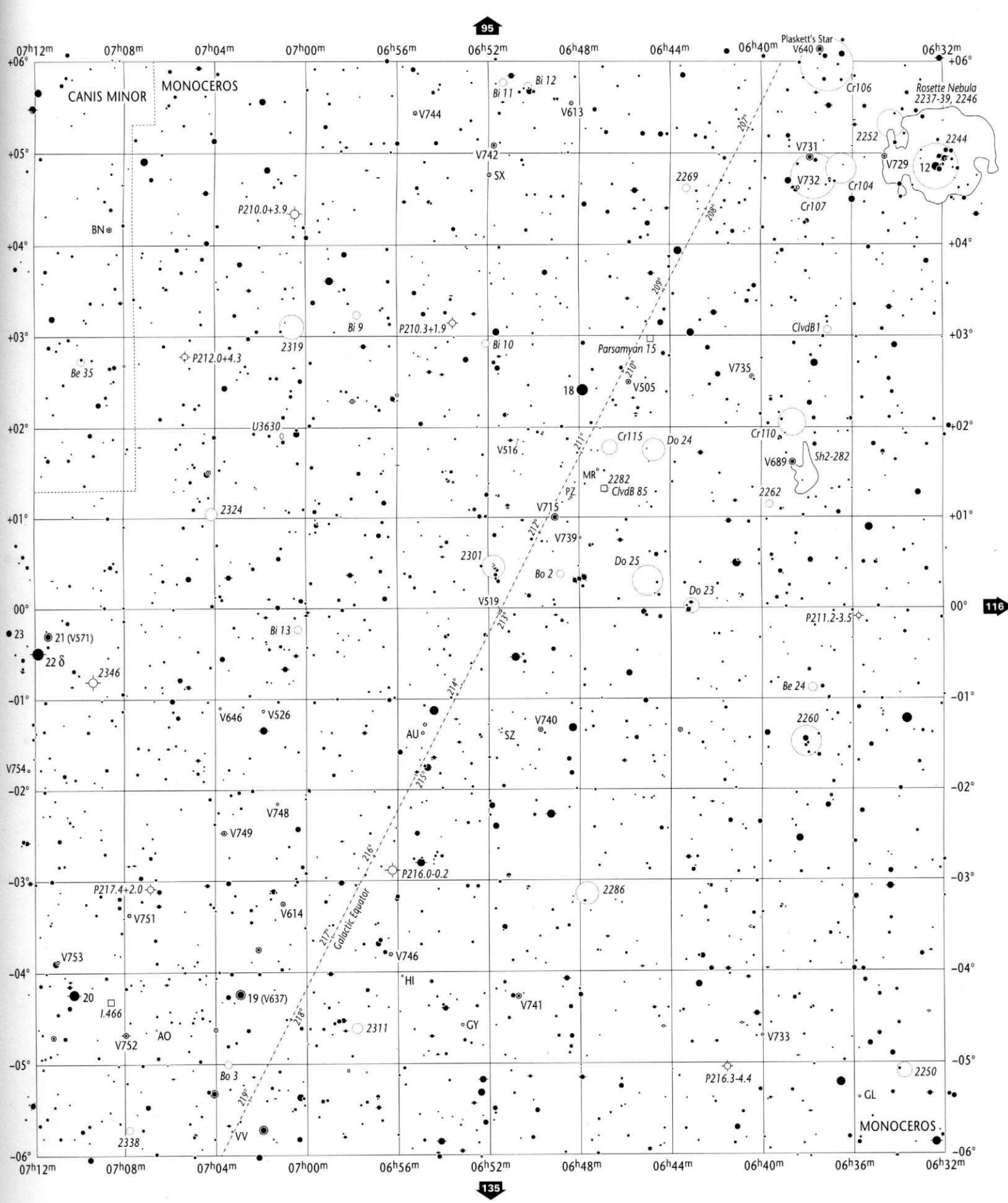
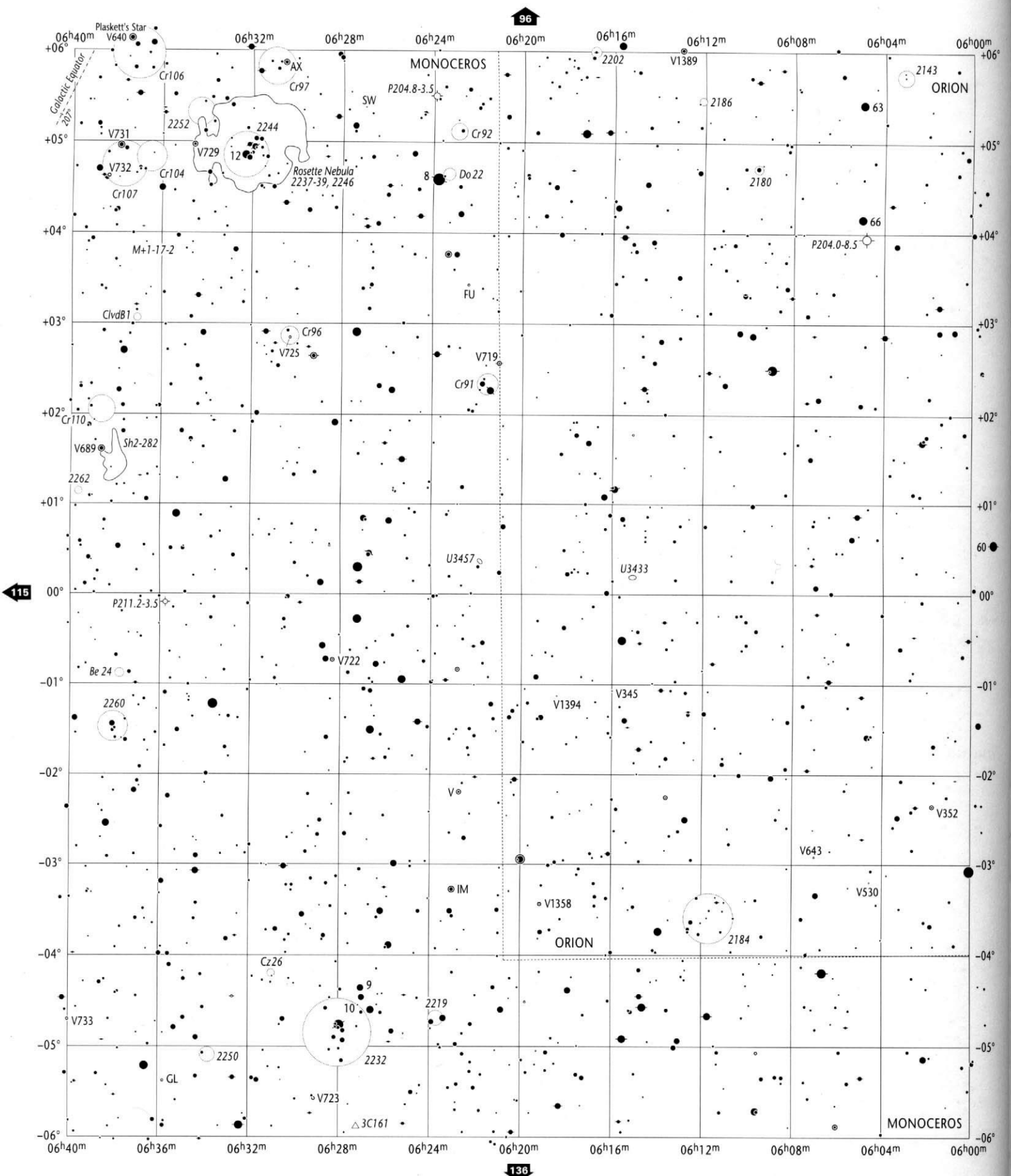


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

06h32m to 07h52m
+06° to −06°

MON
CMI

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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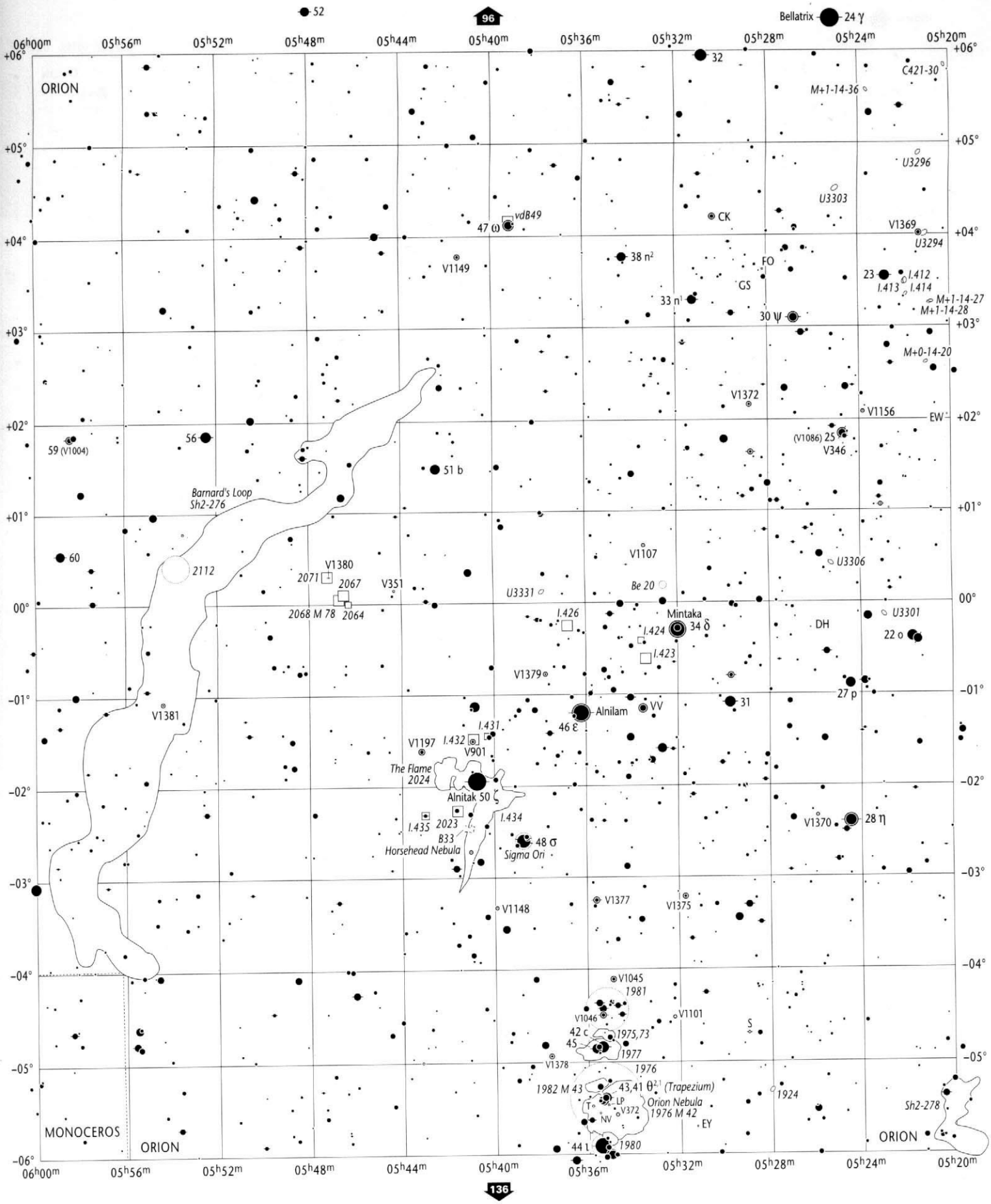


Open Star Clusters and Asterisms — to scale, < 5'

Globular Star Clusters — to scale, < 5'

Planetary Nebulae — >30', 30'-10', 10'-5', < 5'

Bright & Dark Nebulae — to scale, 10' - 5', < 5'

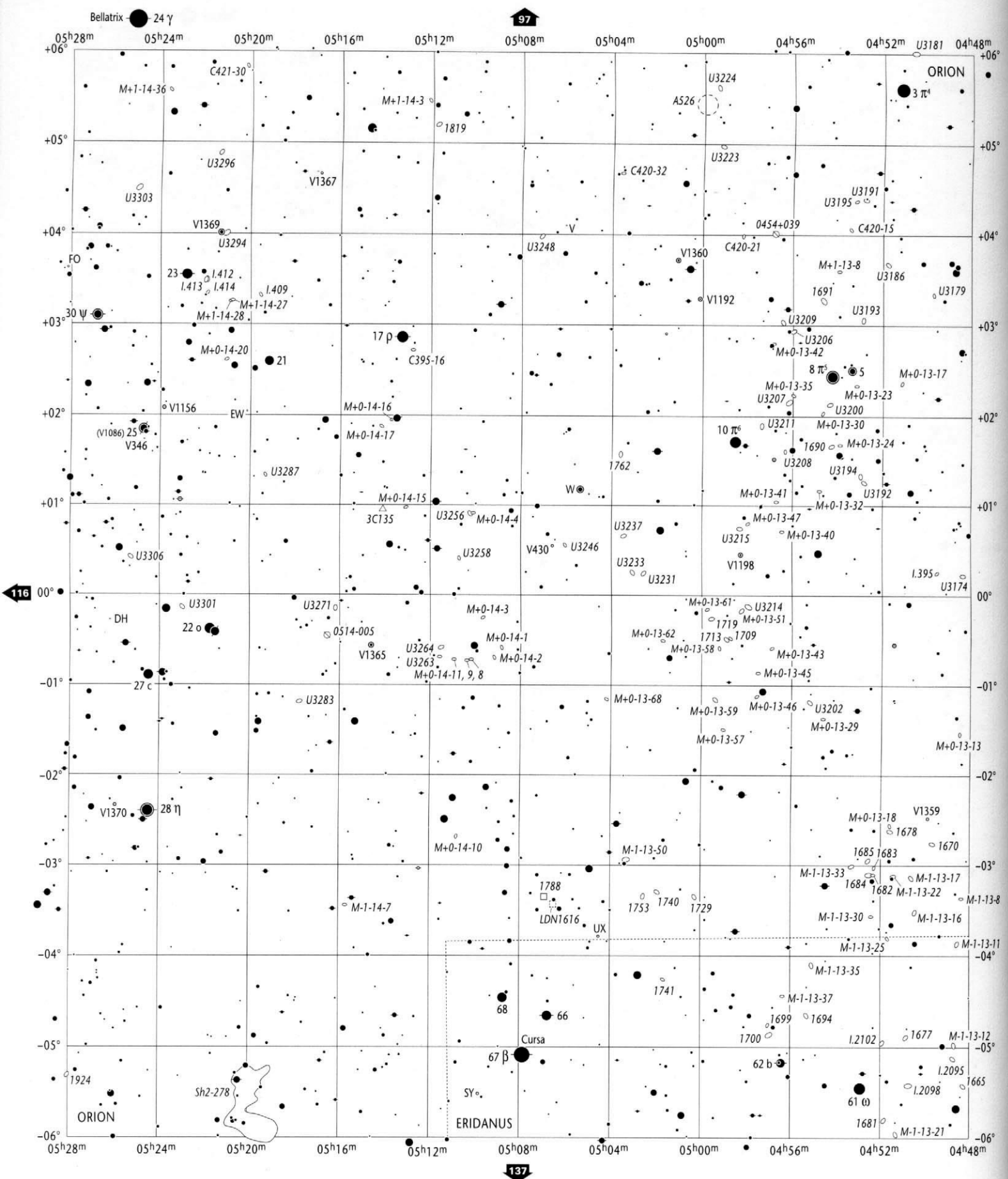
Galaxies — > 5' to scale; 5'-2', 2'-1', < 1' major axis

Galaxy Cluster — to scale

05h20m to 06h40m
+06° to -06°

ORI
MON

Wil Tirion / Barry Rappaport / Will Remaki



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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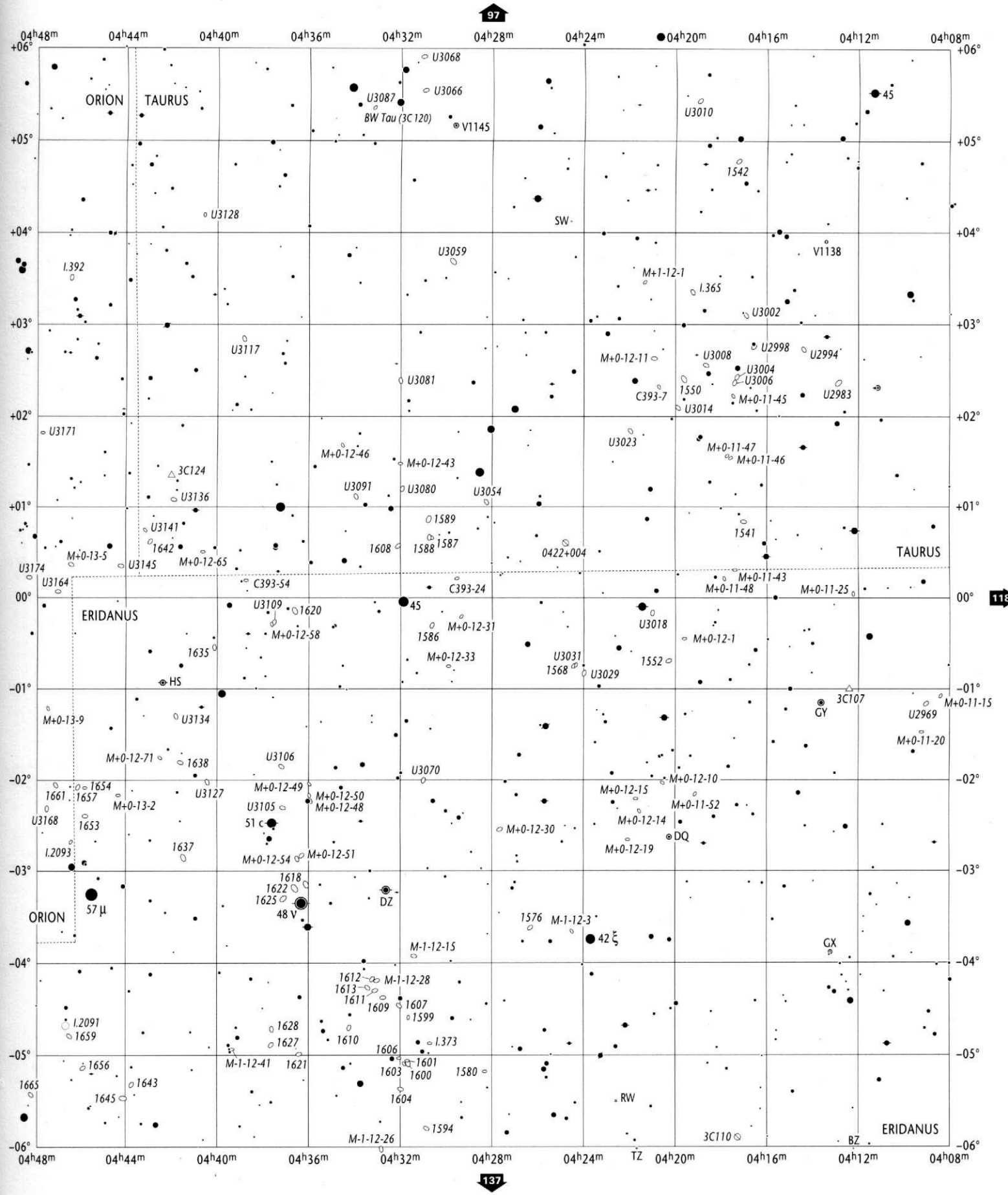
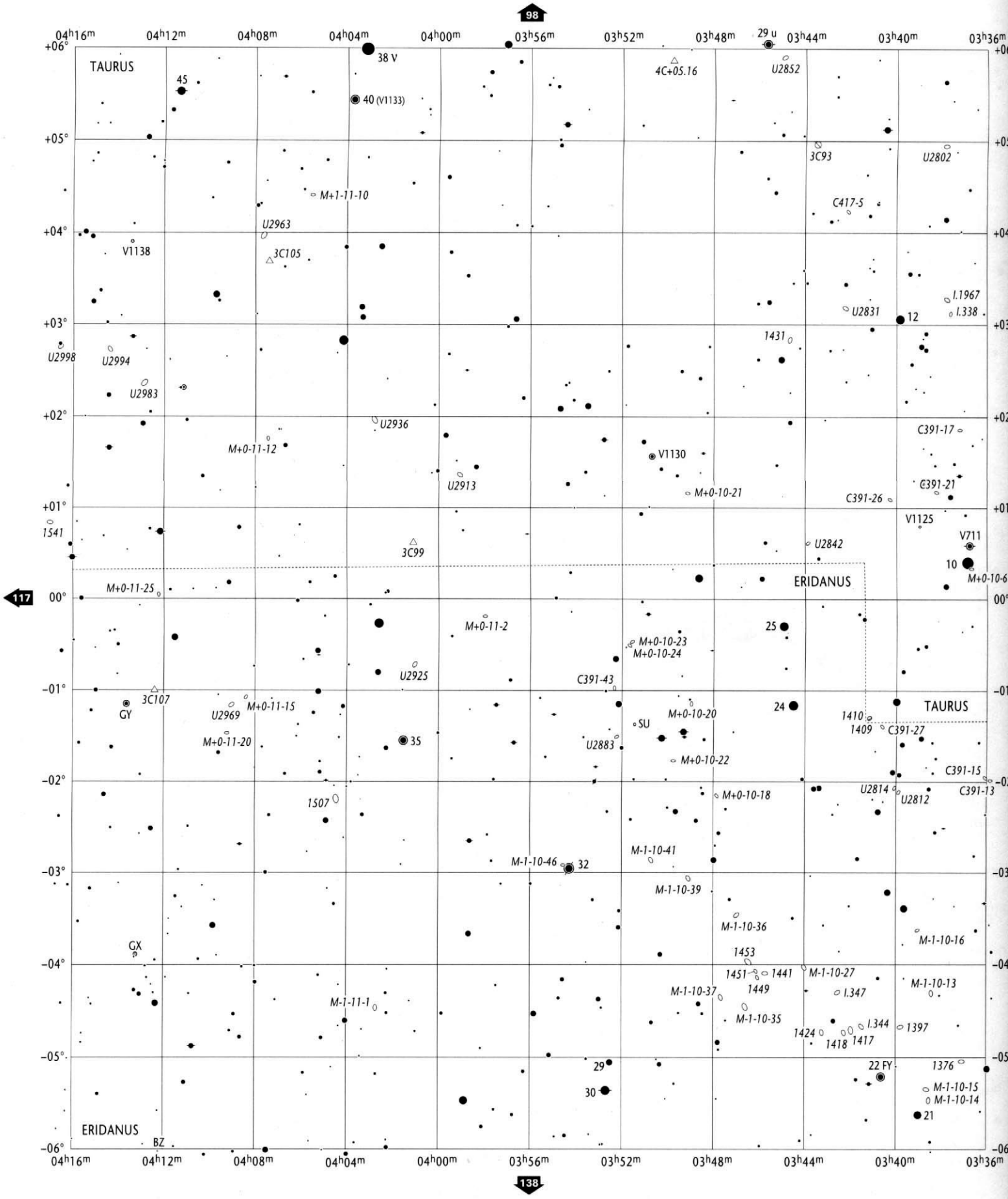


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

04h08m to 05h28m
+06° to -06°

ORI
ERI, TAU

Wil Tirion / Barry Rappaport / Will Remaklus



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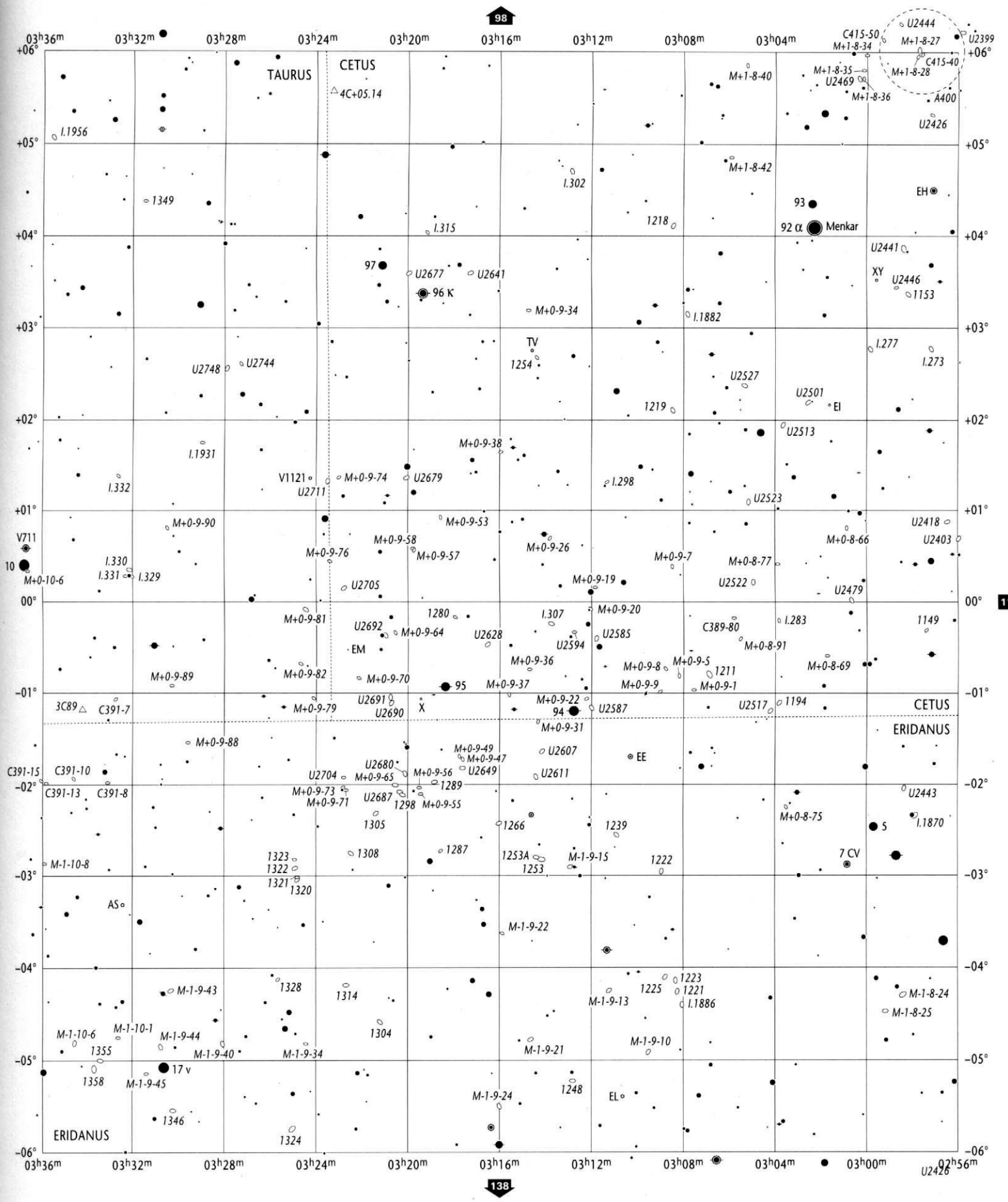
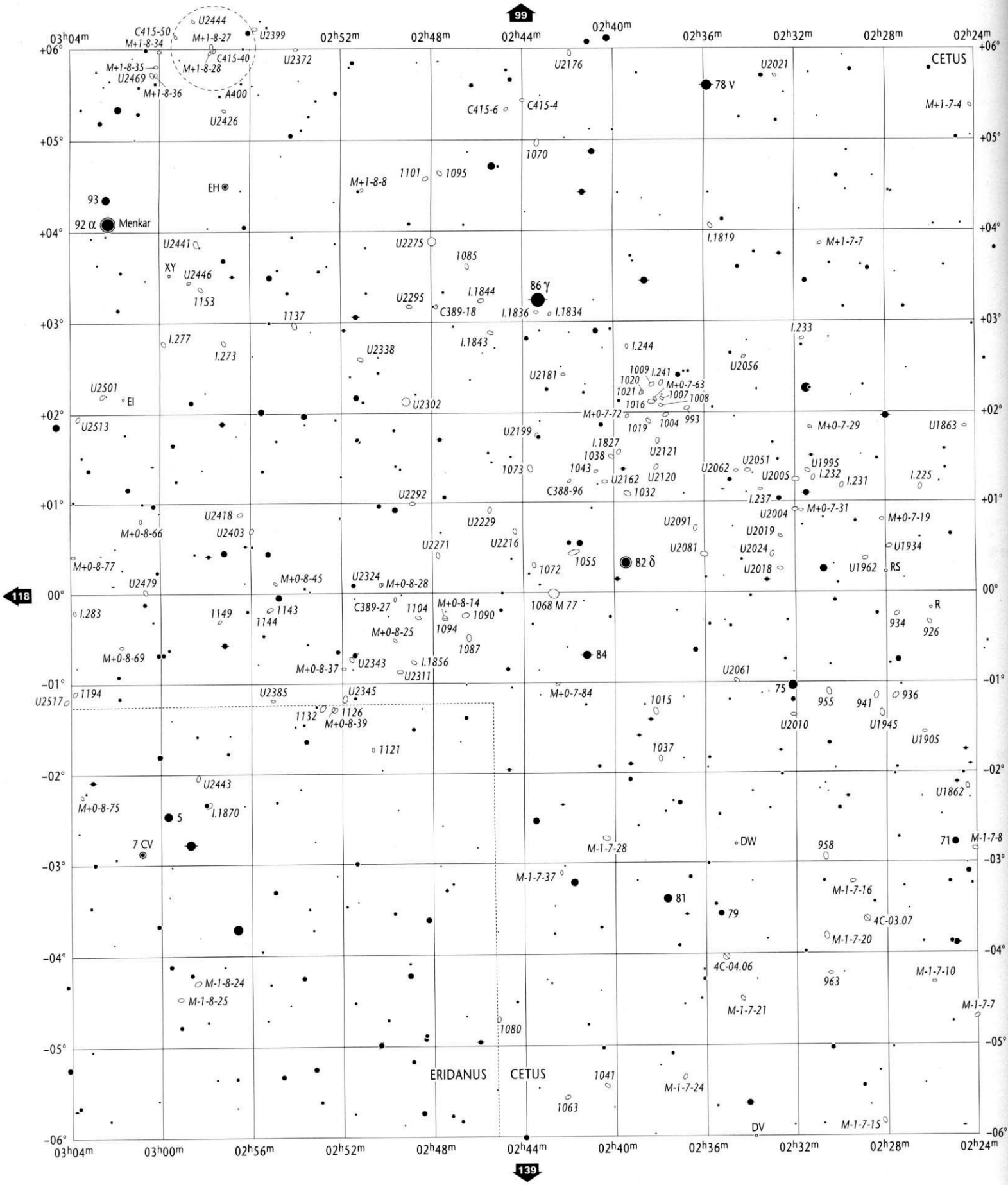


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale, < 5'	to scale, < 5'	>30", 30"-10", 10"-5", < 5"	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale	**02h56m to 04h16m +06° to -06°**	**ERI** TAU, CET

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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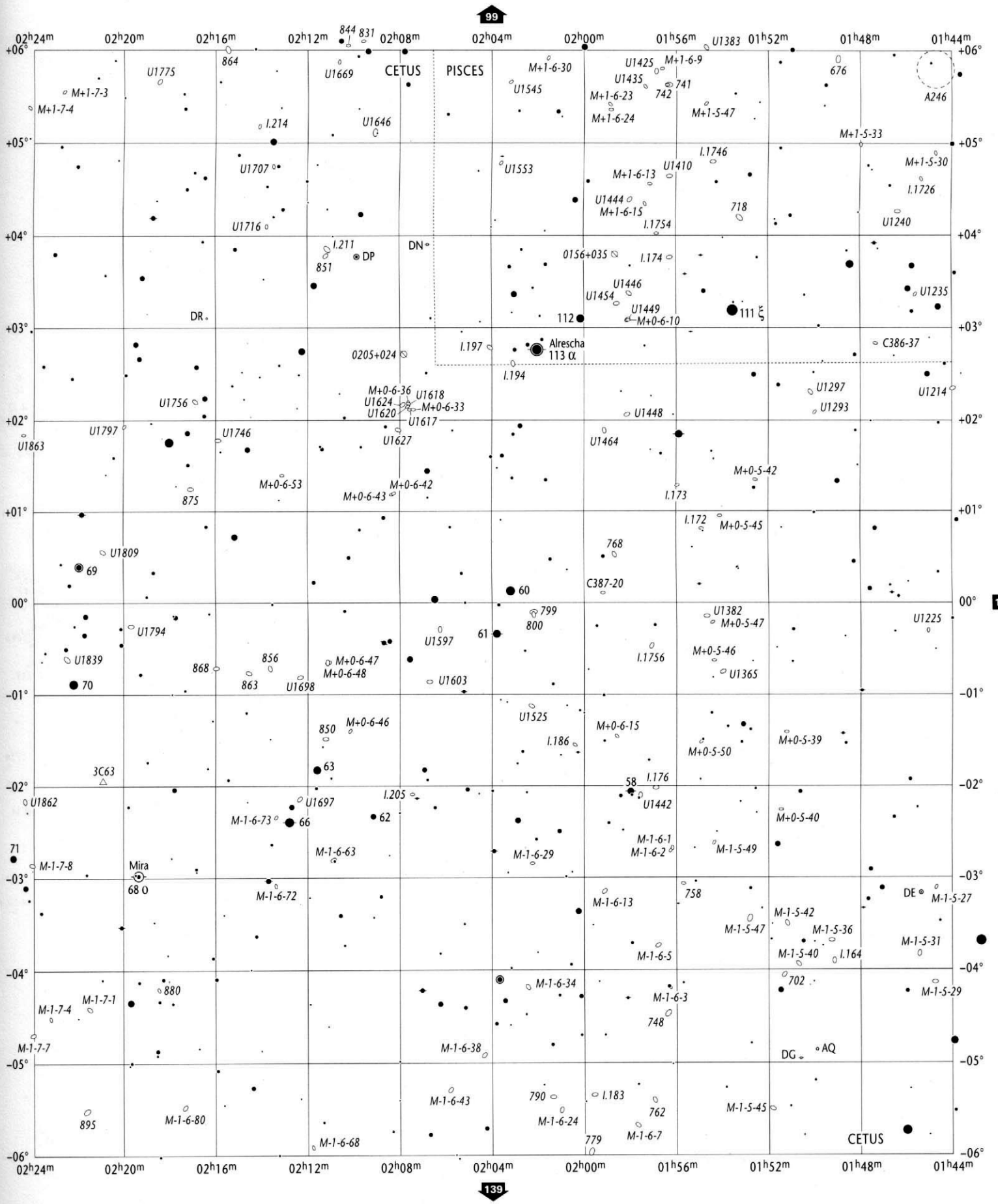
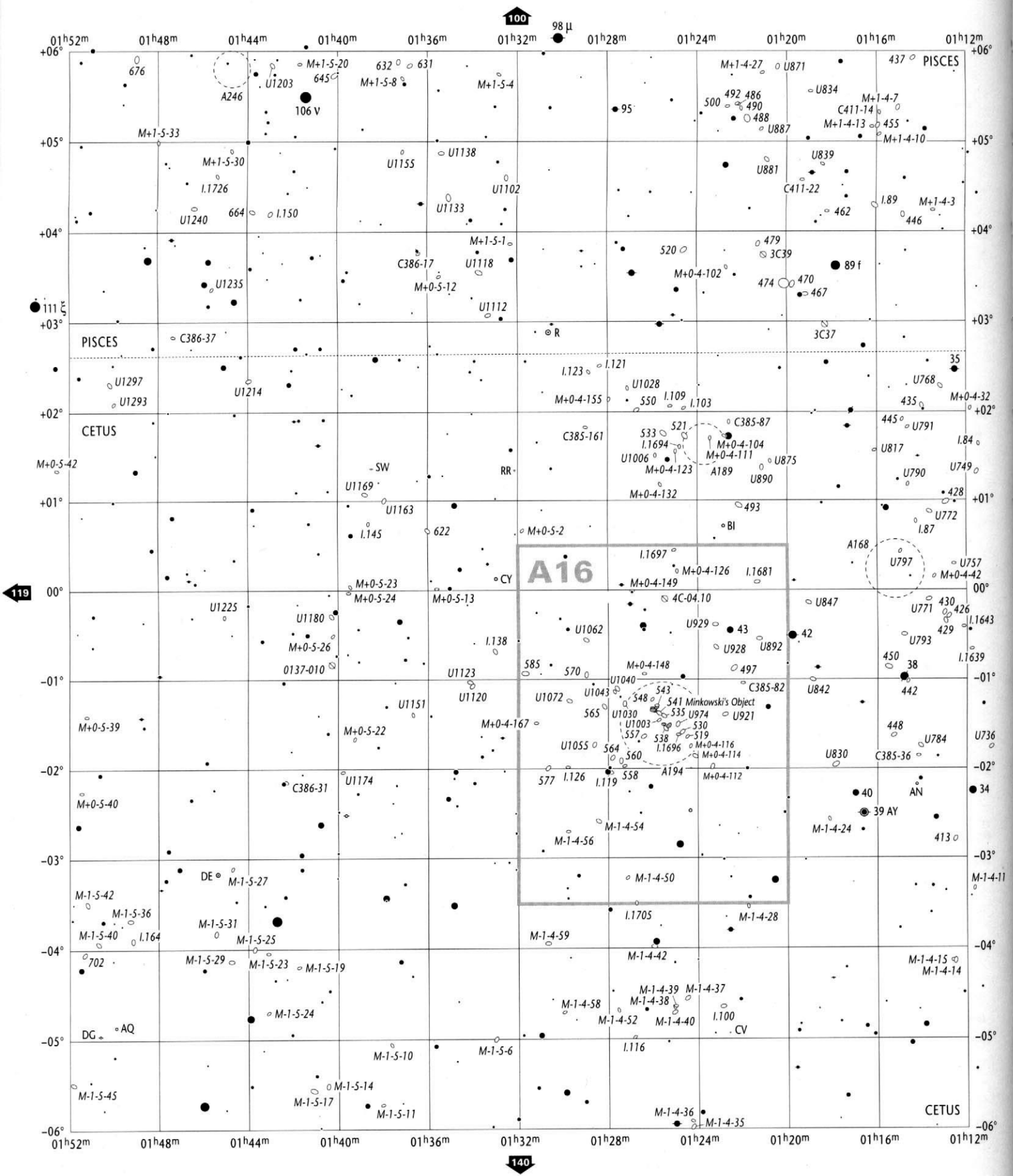


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale

01h44m to 03h04m
+06° to -06°

CET
ERI, PSC

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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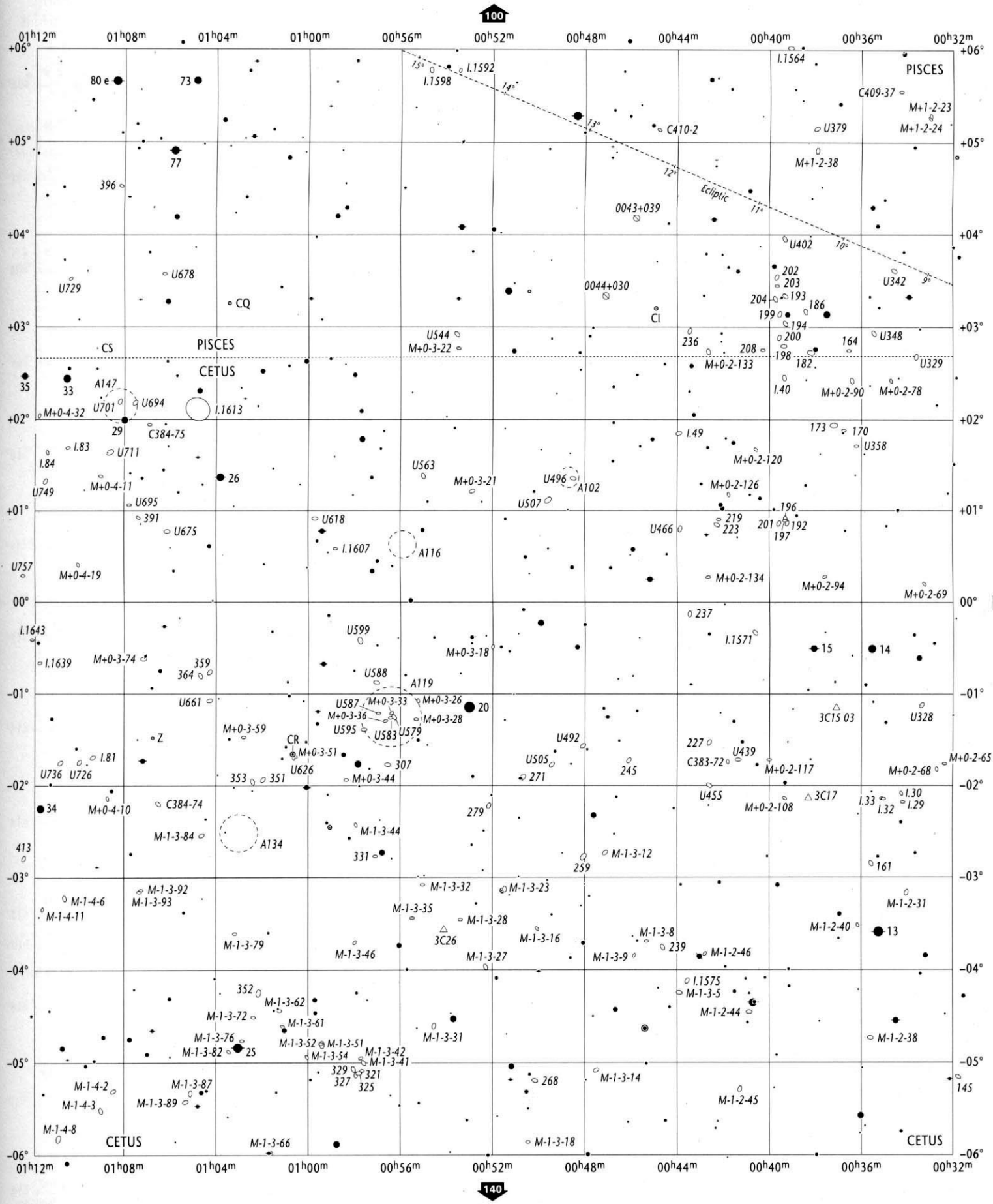
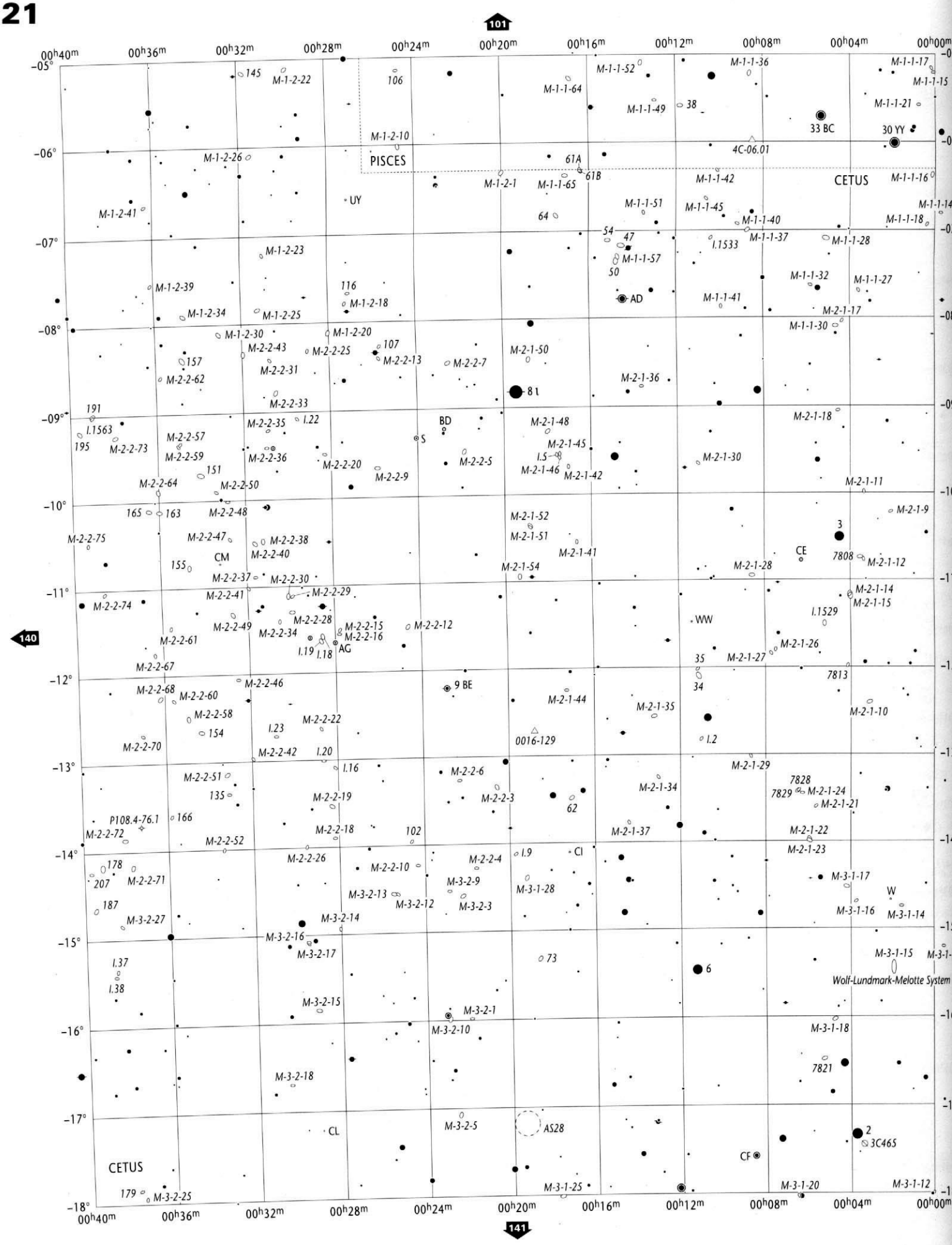


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale	**00h32m to 01h52m +06° to -06°**	**CET** PSC

Wil Tirion / Barry Rappaport / Will Remaklus



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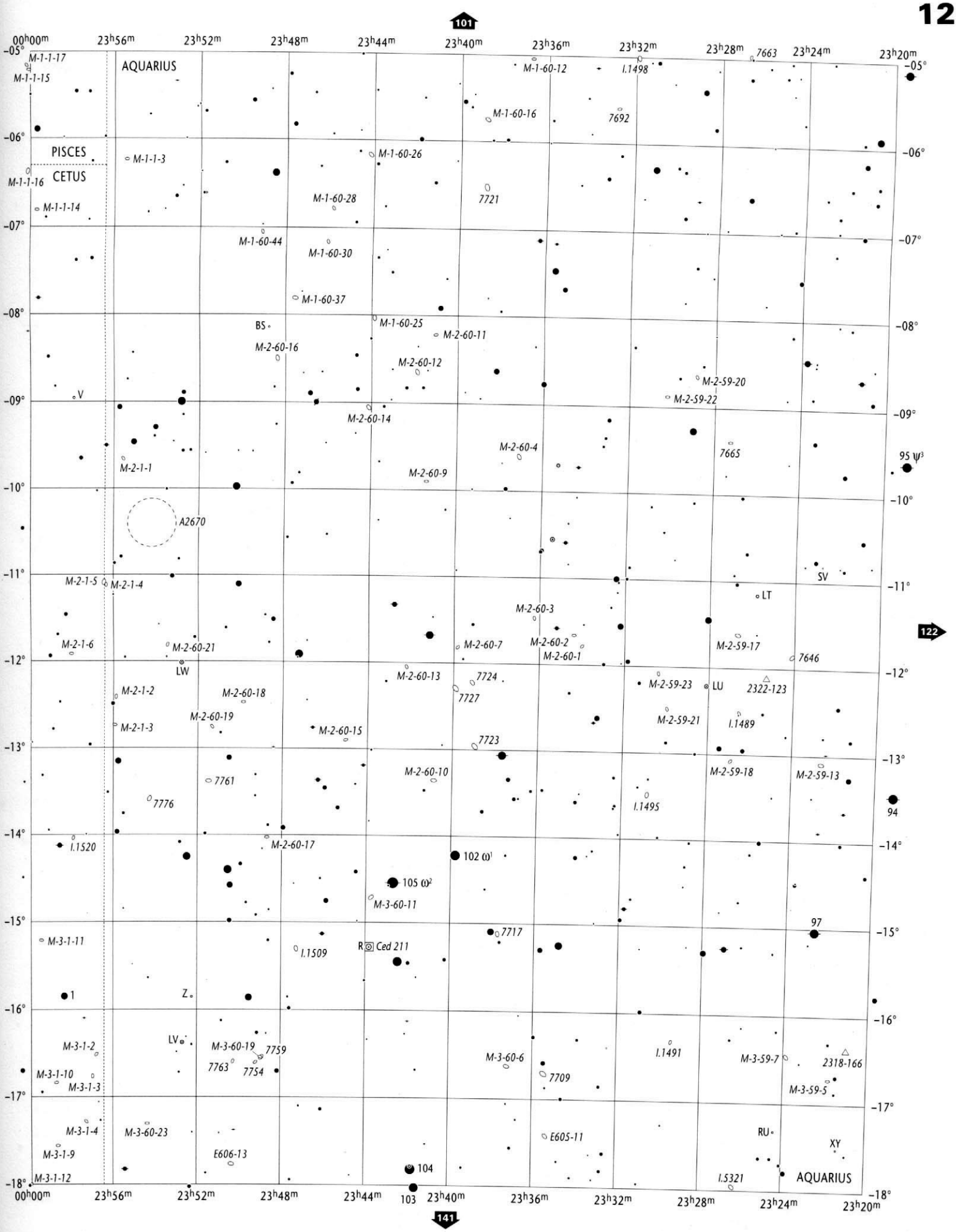
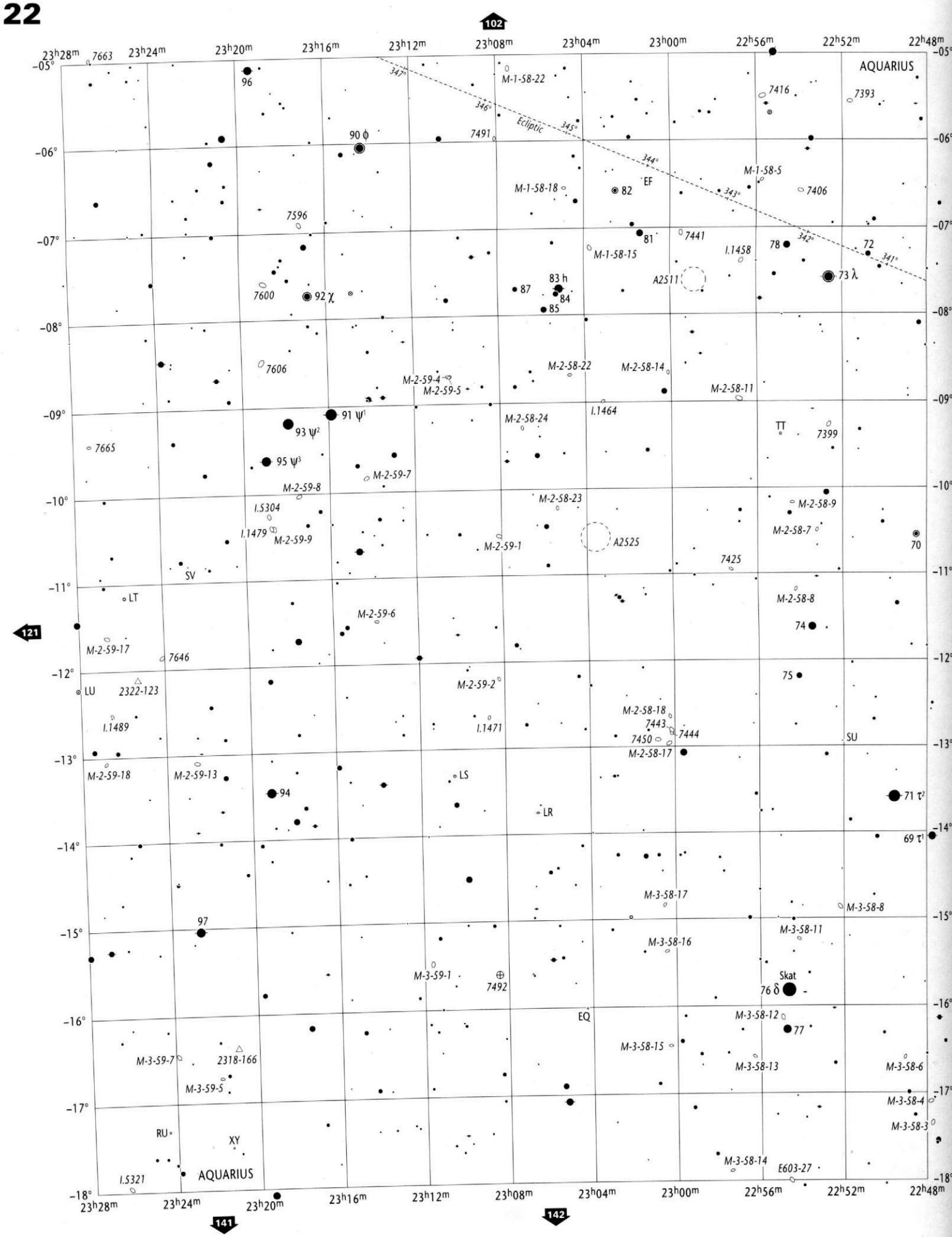


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30", 30"-10", 10"-5", < 5"	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

00h40m to 23h20m
-05° to -18°

CET
AQR, PSC

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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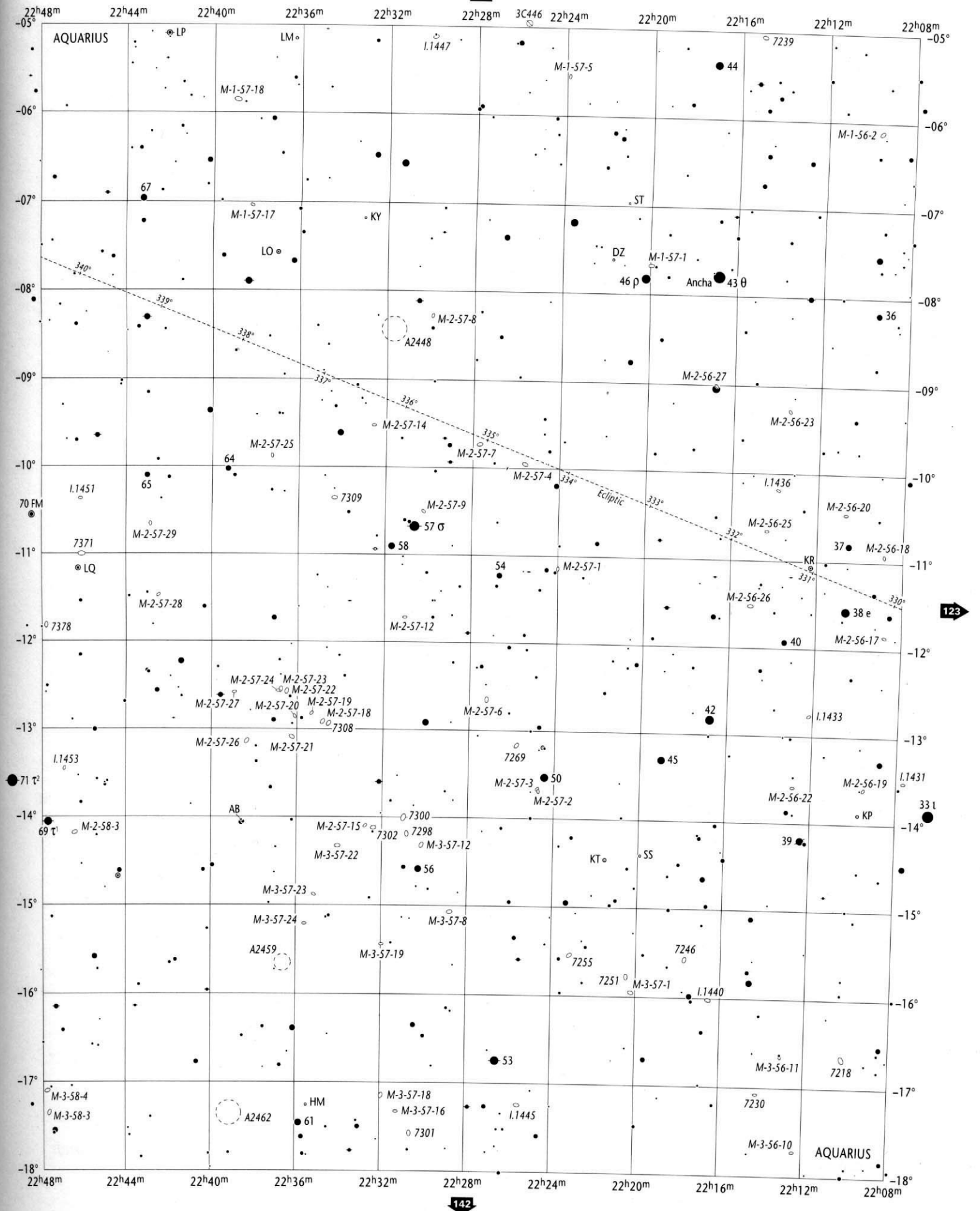
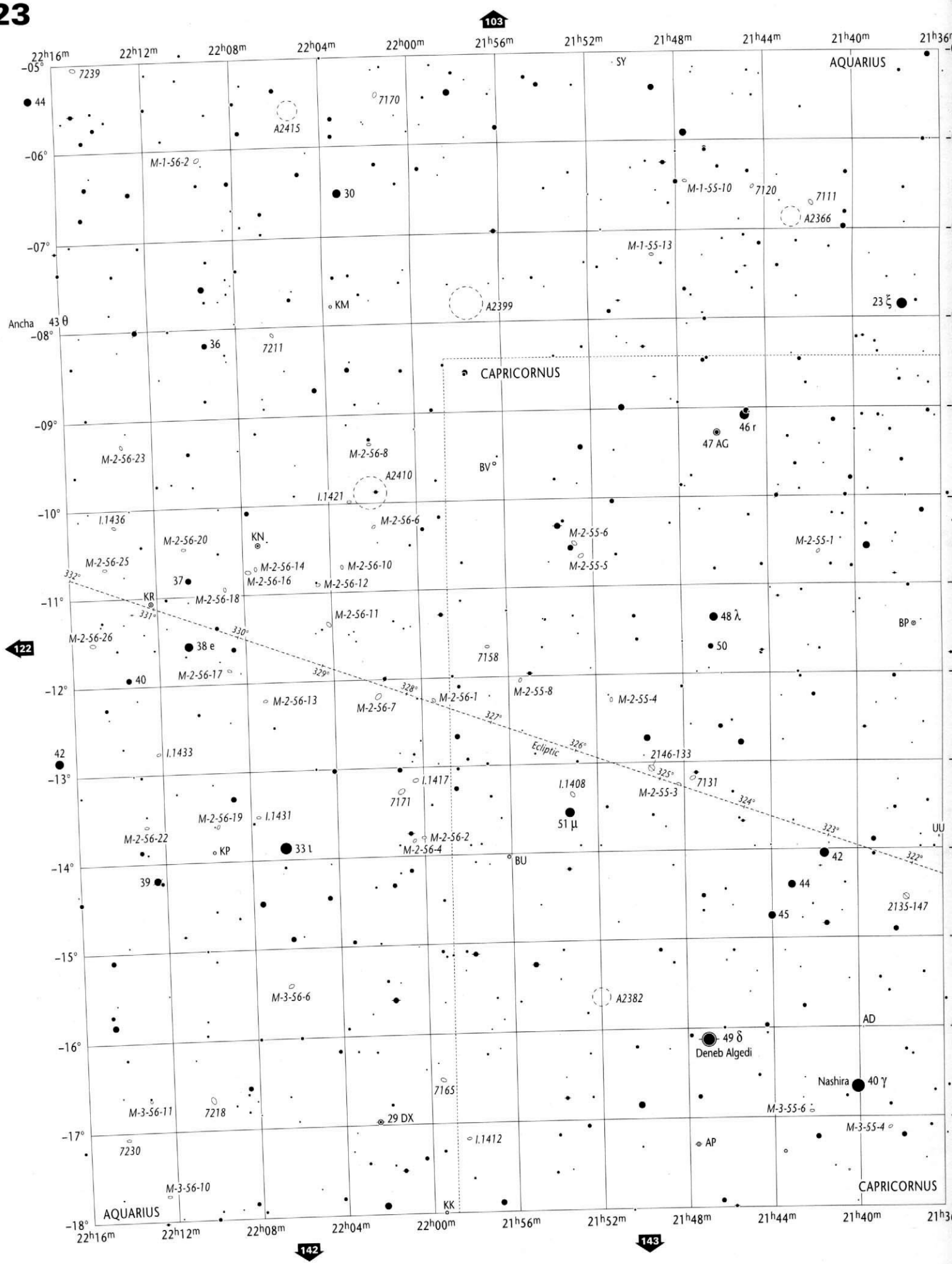


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale · < 5'	to scale · < 5'	>30" · 30"-10" · 10"-5" · < 5"	to scale · 10' - 5' · < 5'	> 5' to scale · 5'-2' · 2'-1' · < 1' major axis	to scale

22h08m to 23h28m
-05° to -18°

AQR

Wil Tirion / Barry Rappaport / Will Remaklus



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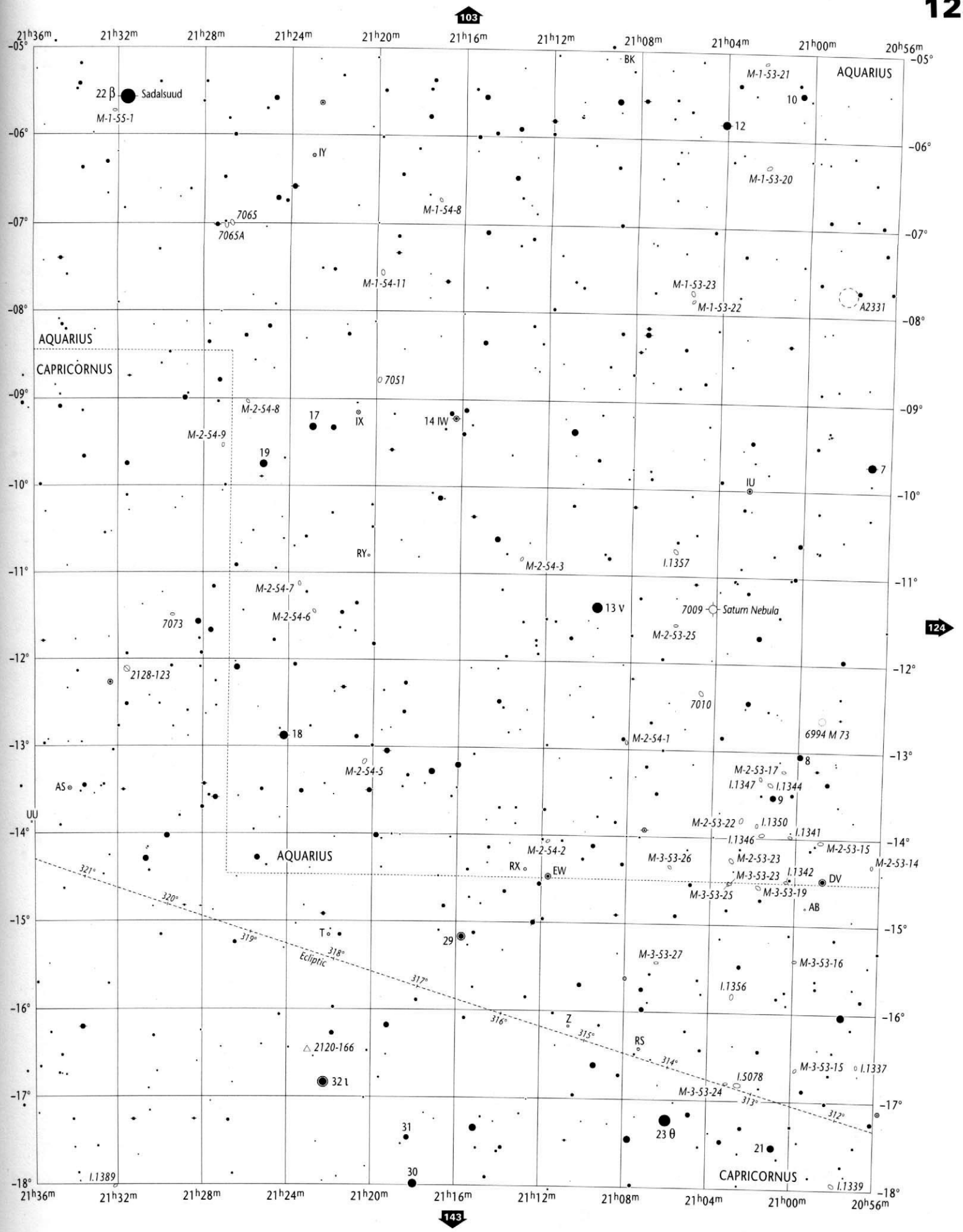
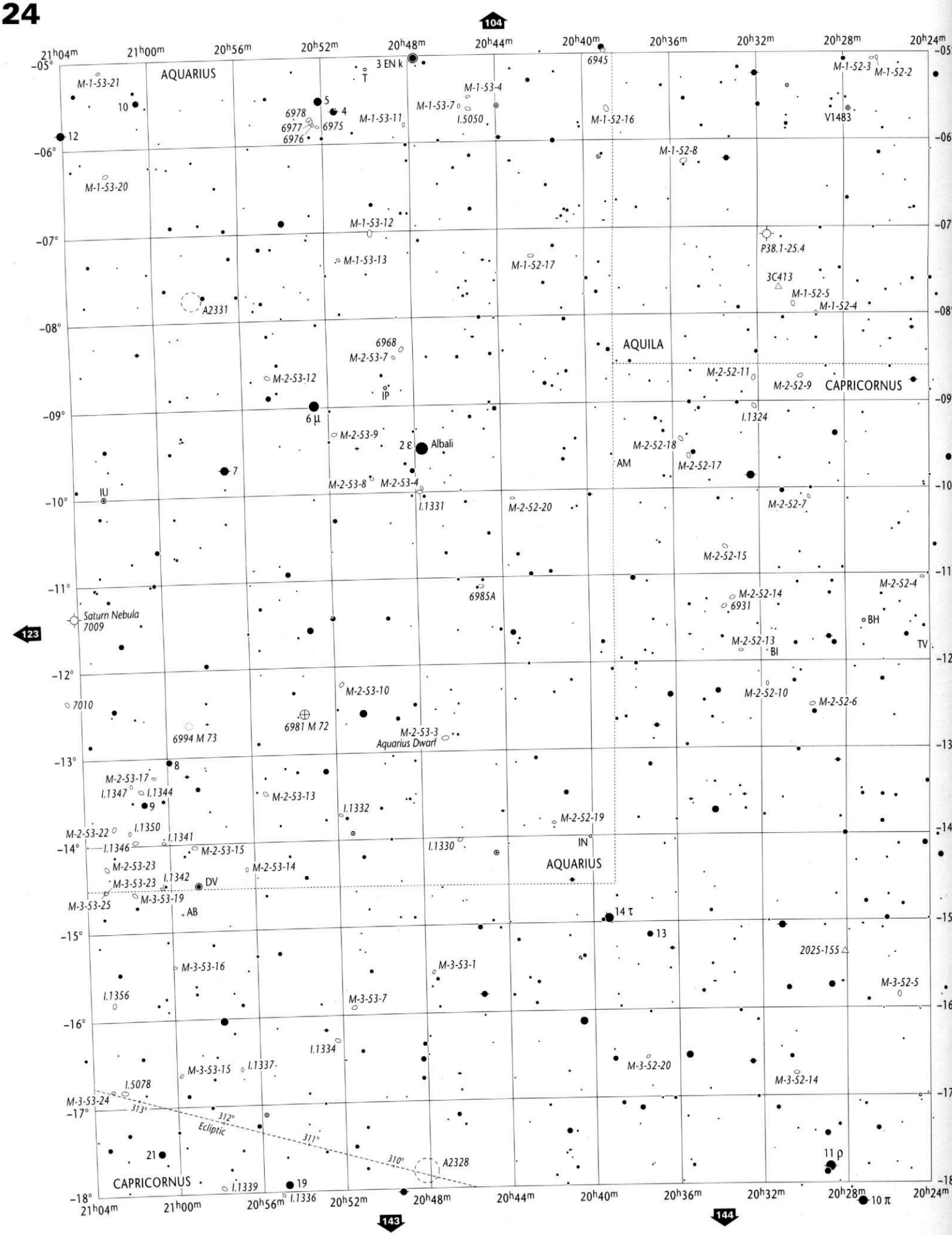


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30", 30"-10", 10"-5", < 5"	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

20h56m to 22h16m
-05° to -18°

AQR
CAP

Will Tirion / Barry Rappaport / Will Remaklus


104
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AQUARIUS
AQUILA
CAPRICORNUS
Saturn Nebula
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6981 M 72
Aquarius Dwarf
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2 ε
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11 ρ
10 π
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311°
310°
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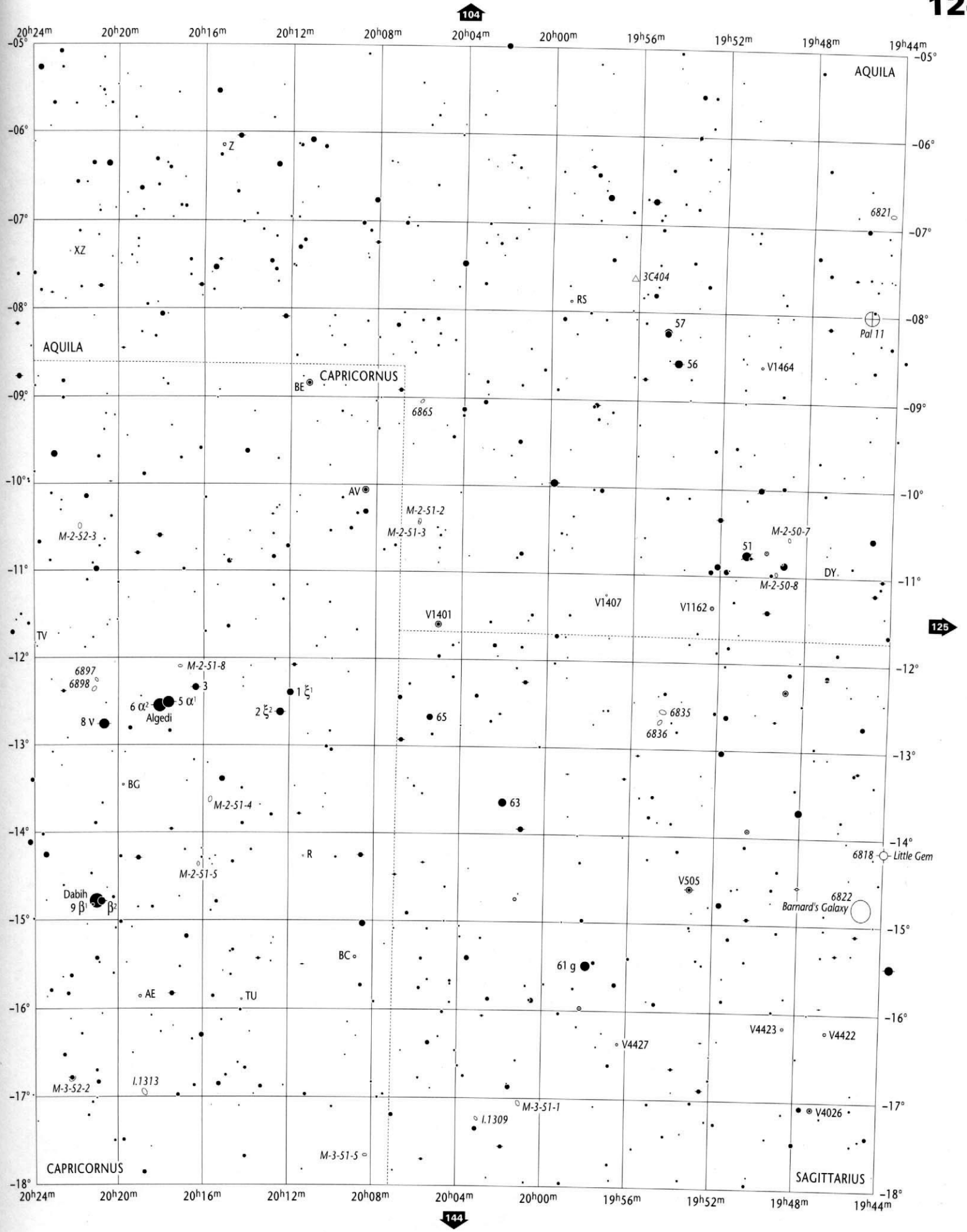
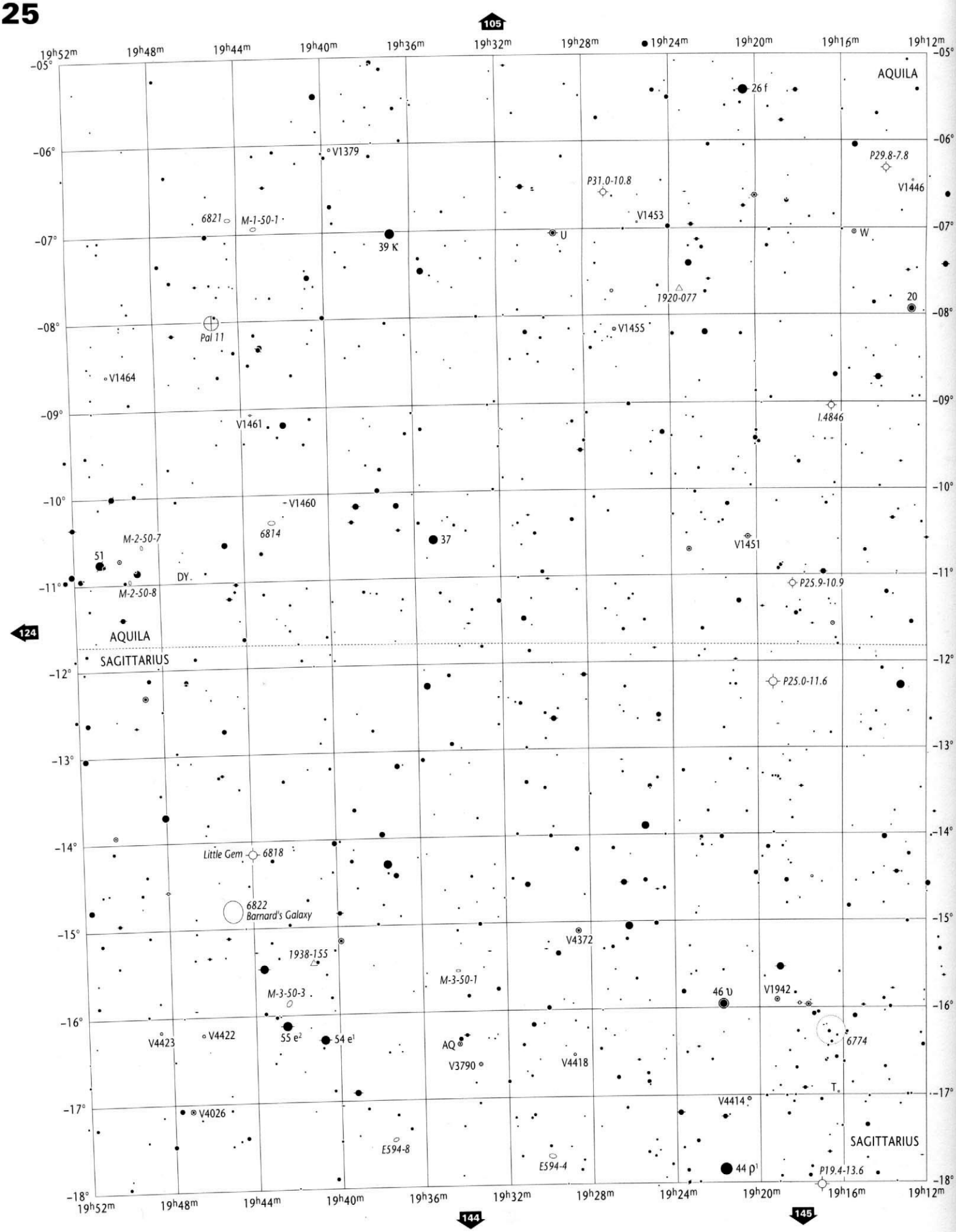


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30", 30"-10", 10"-5", < 5"	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

19h44m to 21h04m
-05° to -18°

CAP
AQL, AQR, SGR

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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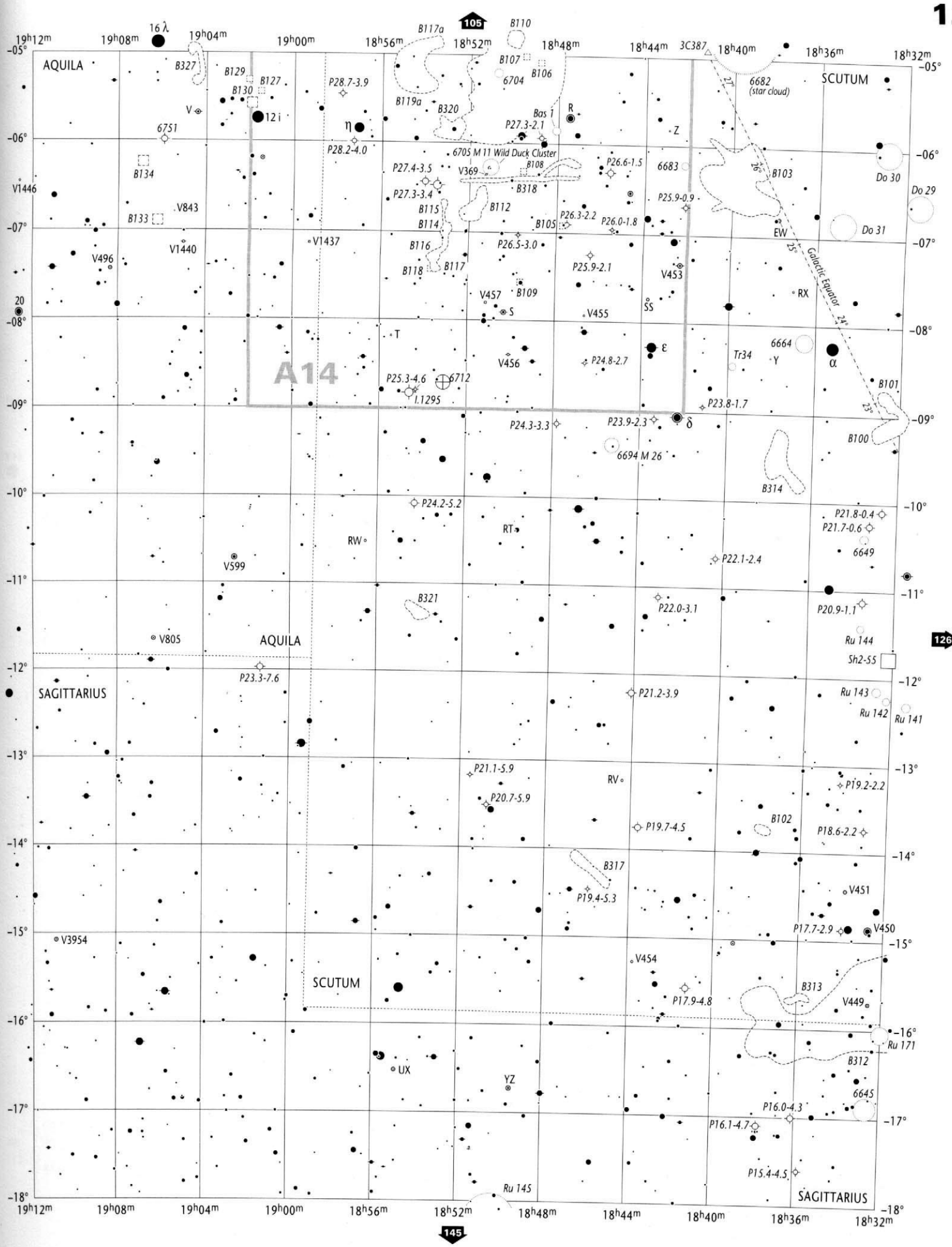
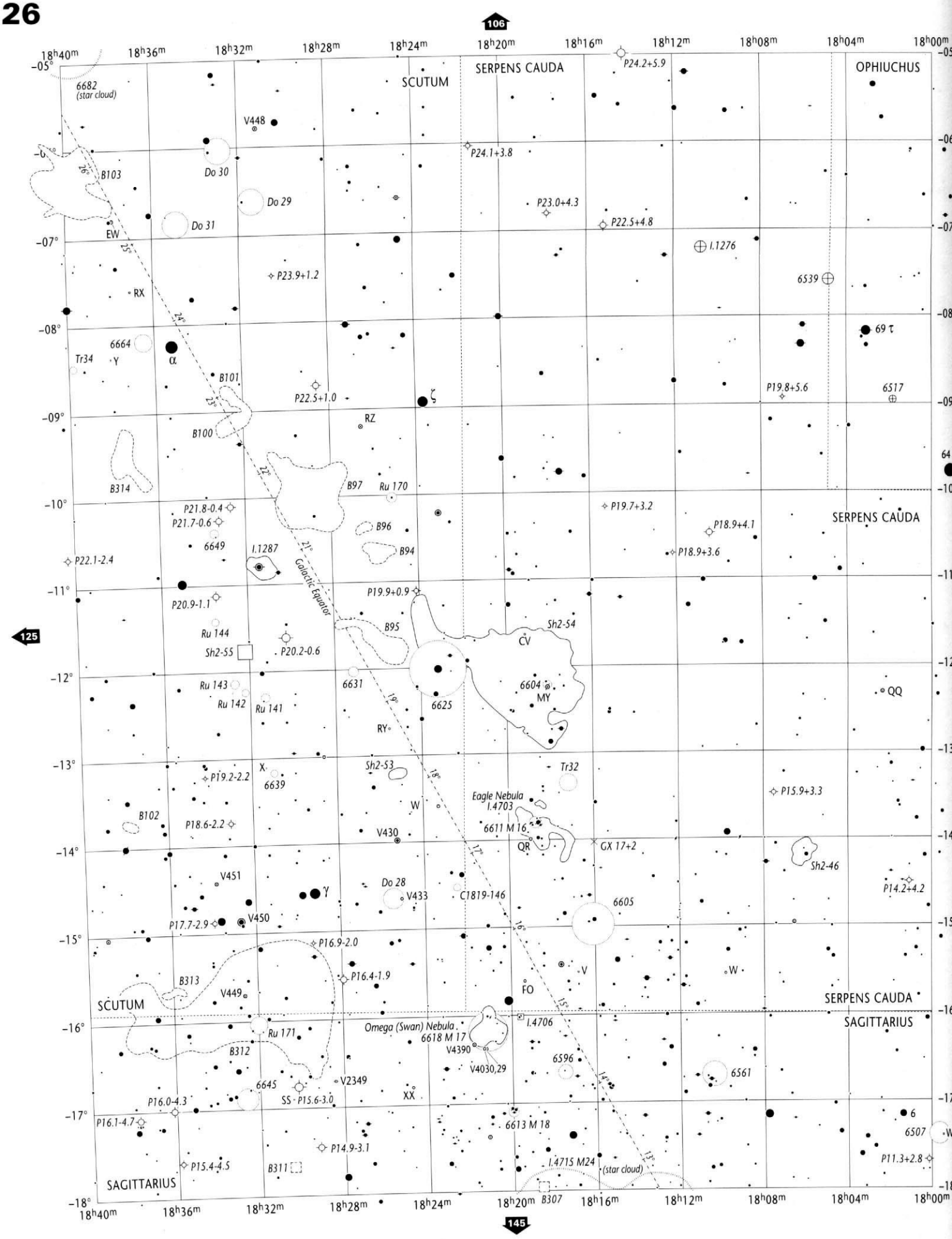


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	18^h32^m to 19^h52^m $-05°$ to $-18°$	SGR AQL, SCT
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Willi Remaklus



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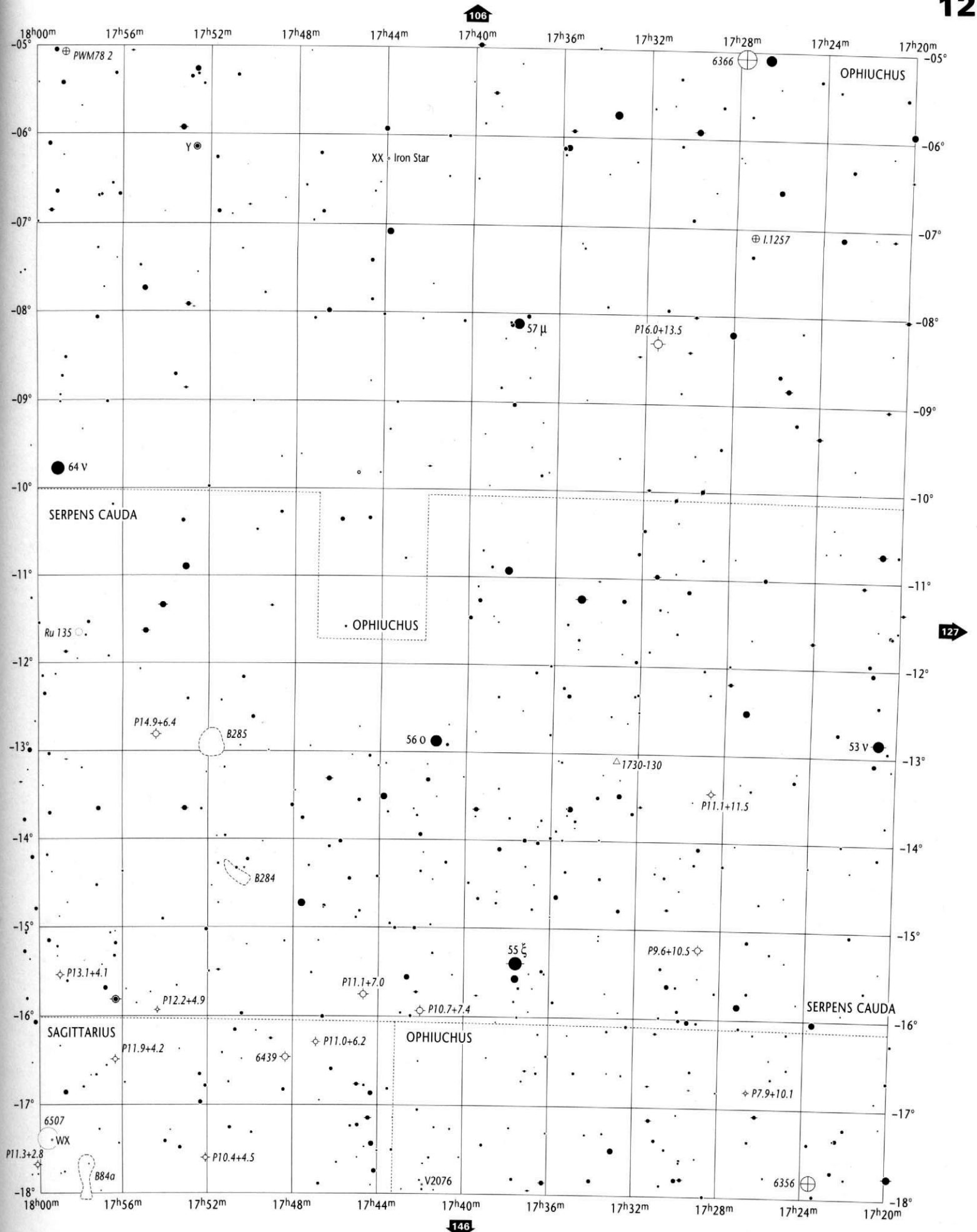
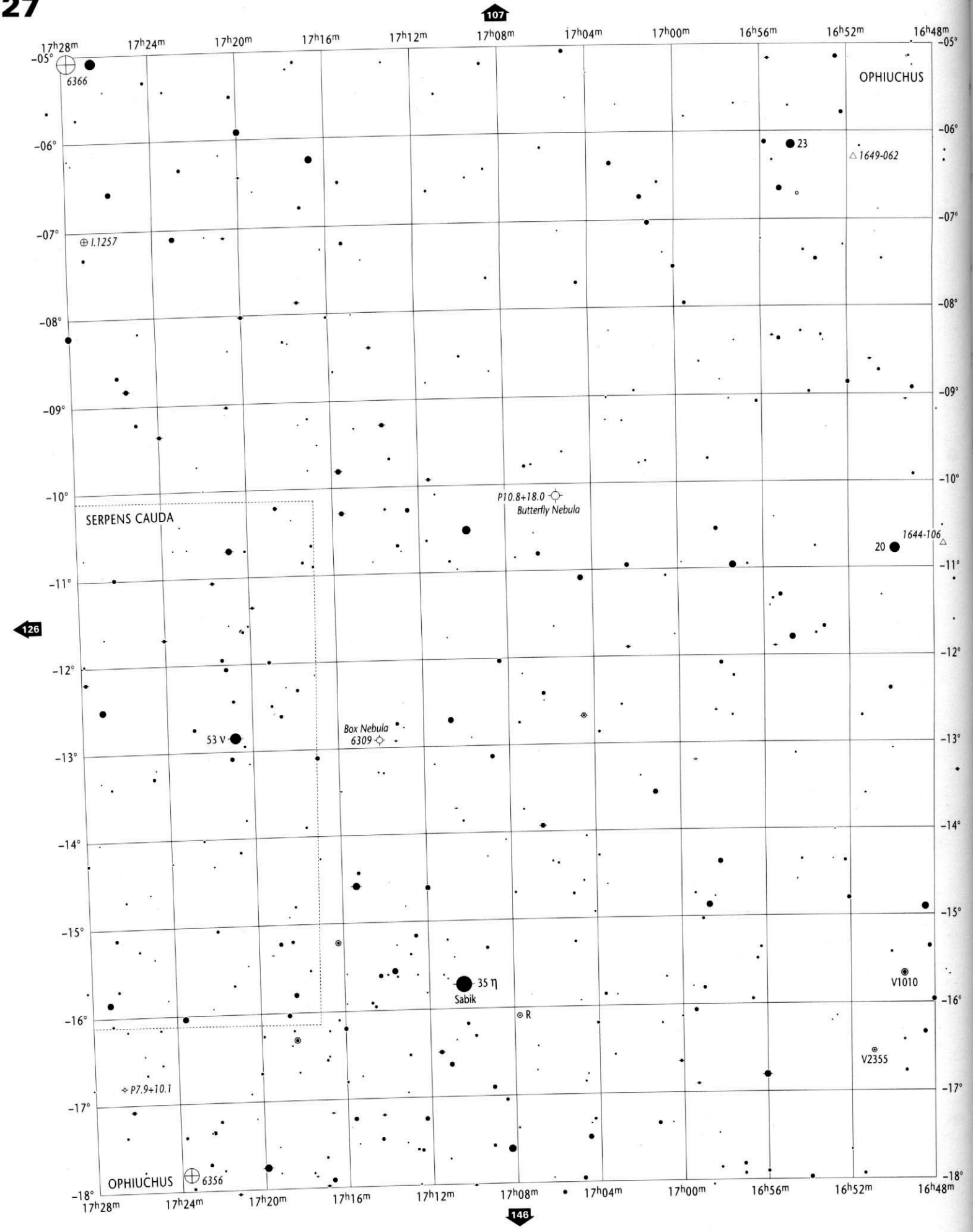


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale <5'	to scale <5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' <5'	>5' to scale; 5'-2' 2'-1' <1' major axis	to scale

17h20m to 18h40m
-05° to -18°

SER
OPH, SCT, SGR

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
△ Radio Source
× X-Ray Source

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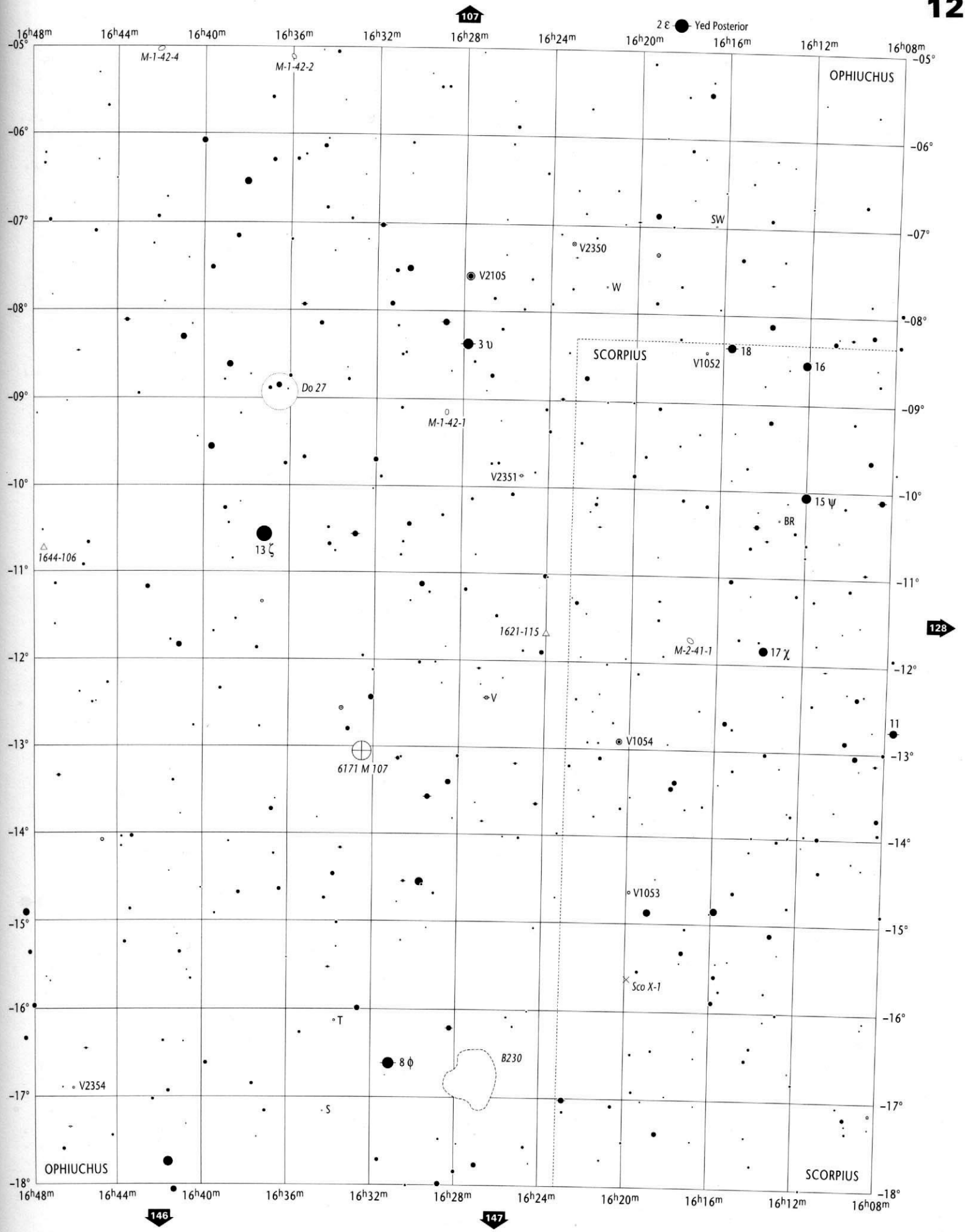
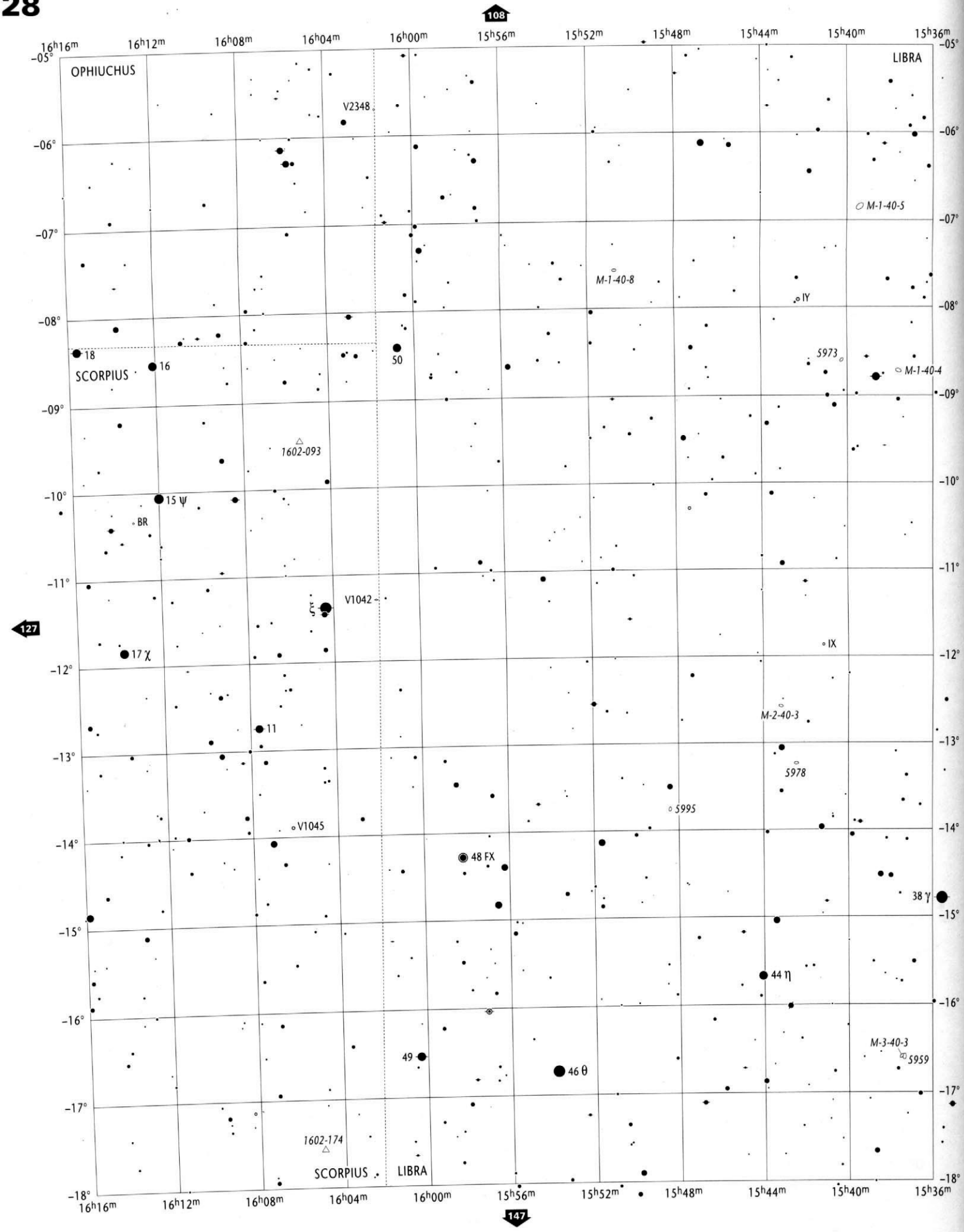


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale	**16h08m to 17h28m −05° to −18°**	**OPH SCO, SER**

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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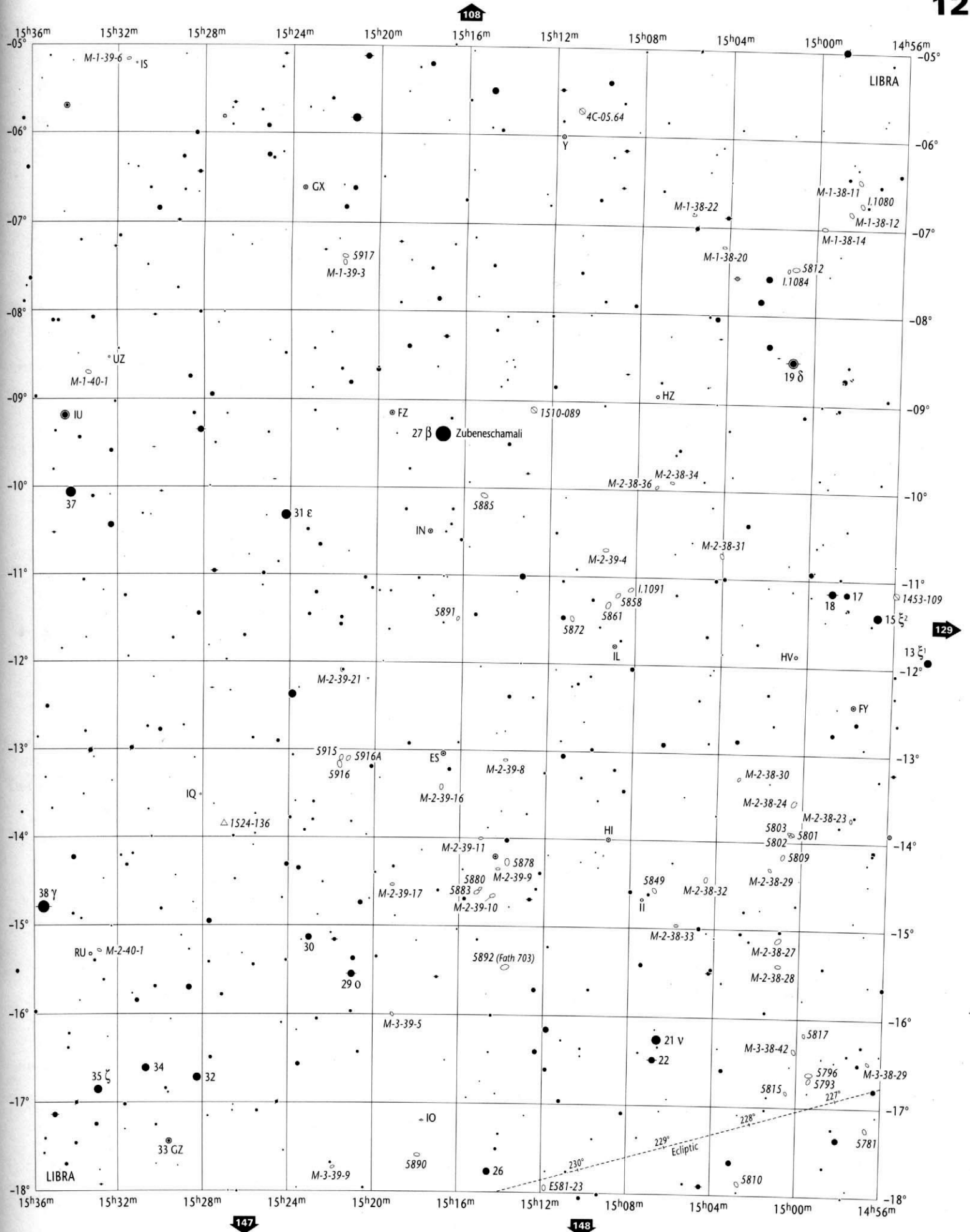
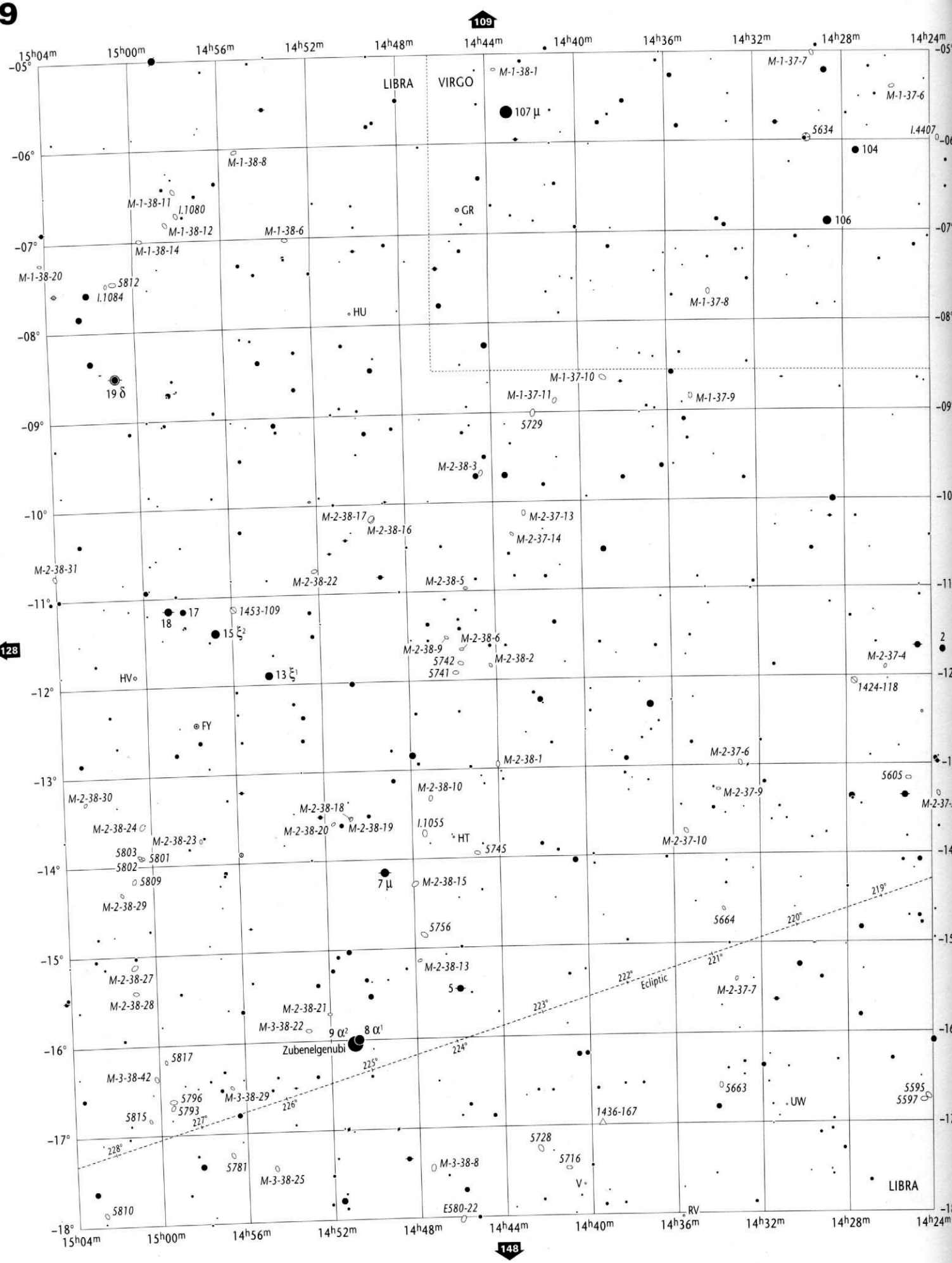


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale	5'-2' 2'-1' < 1' major axis	to scale	**14h56m to 16h16m** **-05° to -18°**	**LIB** SCO, OPH

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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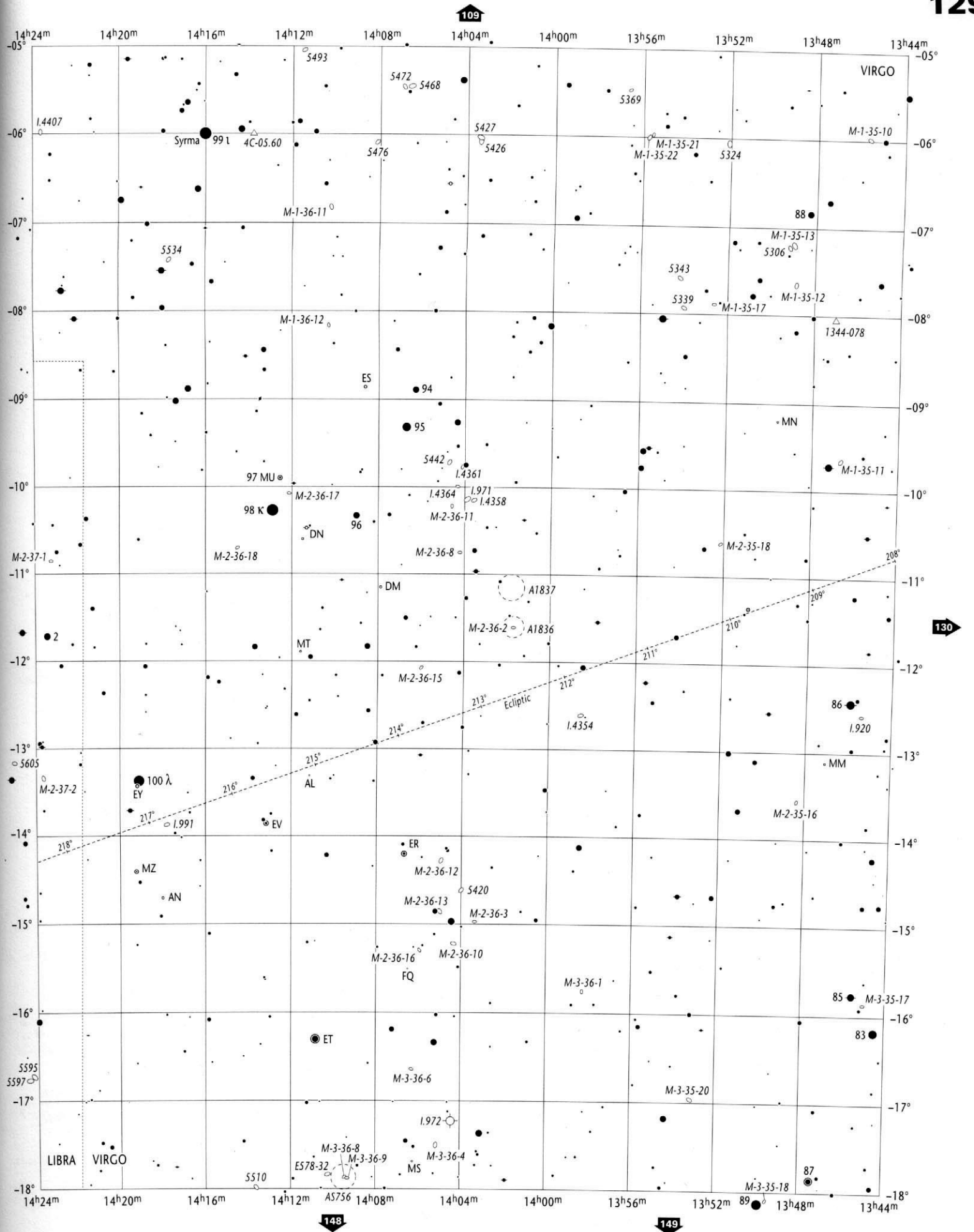
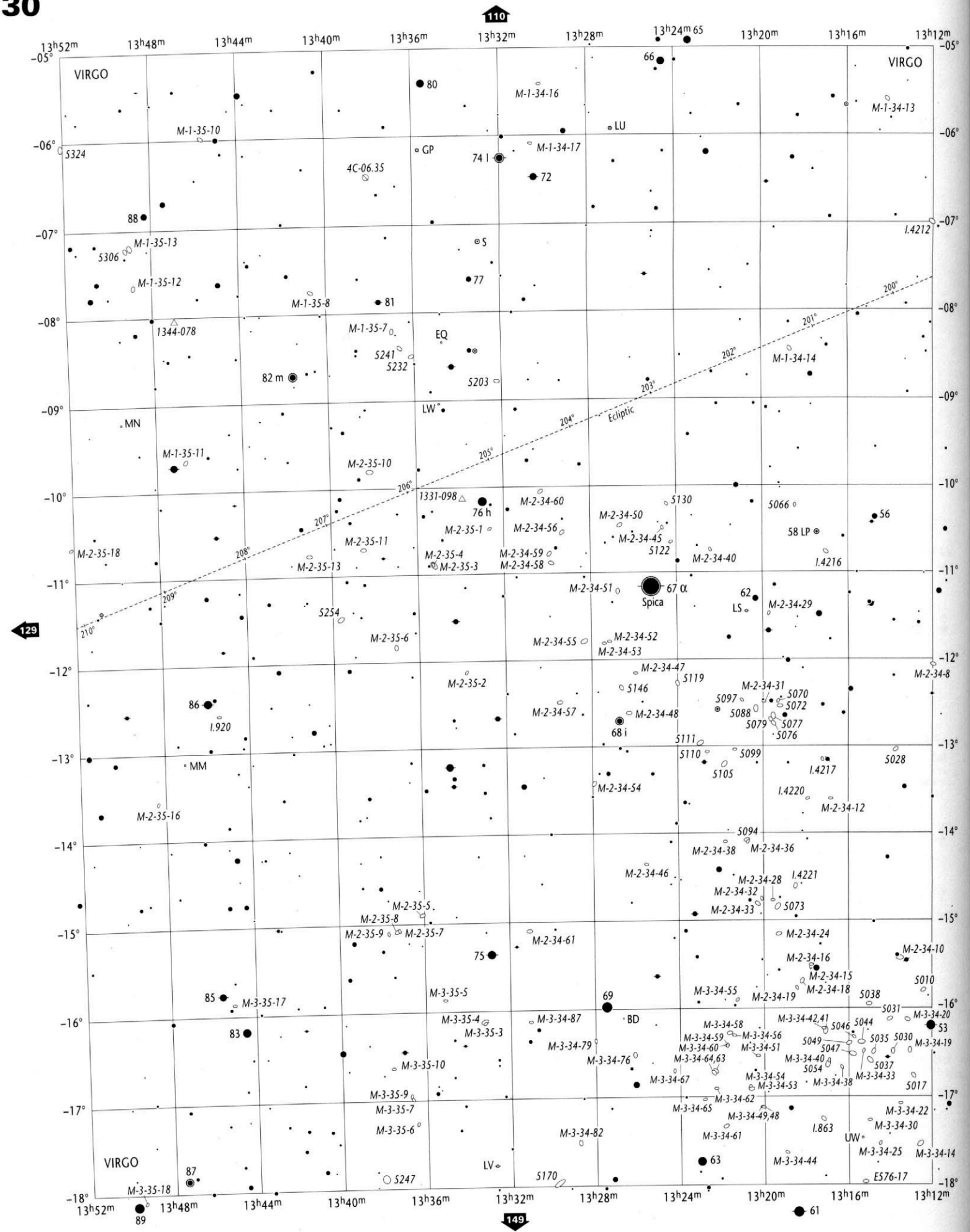


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	13h44m to 15h04m -05° to -18°	VIR LIB
to scale <5'	to scale <5'	>30" 30"-10" 10"-5" <5"	to scale 10'-5' <5'	>5' to scale 5'-2' 2'-1' <1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



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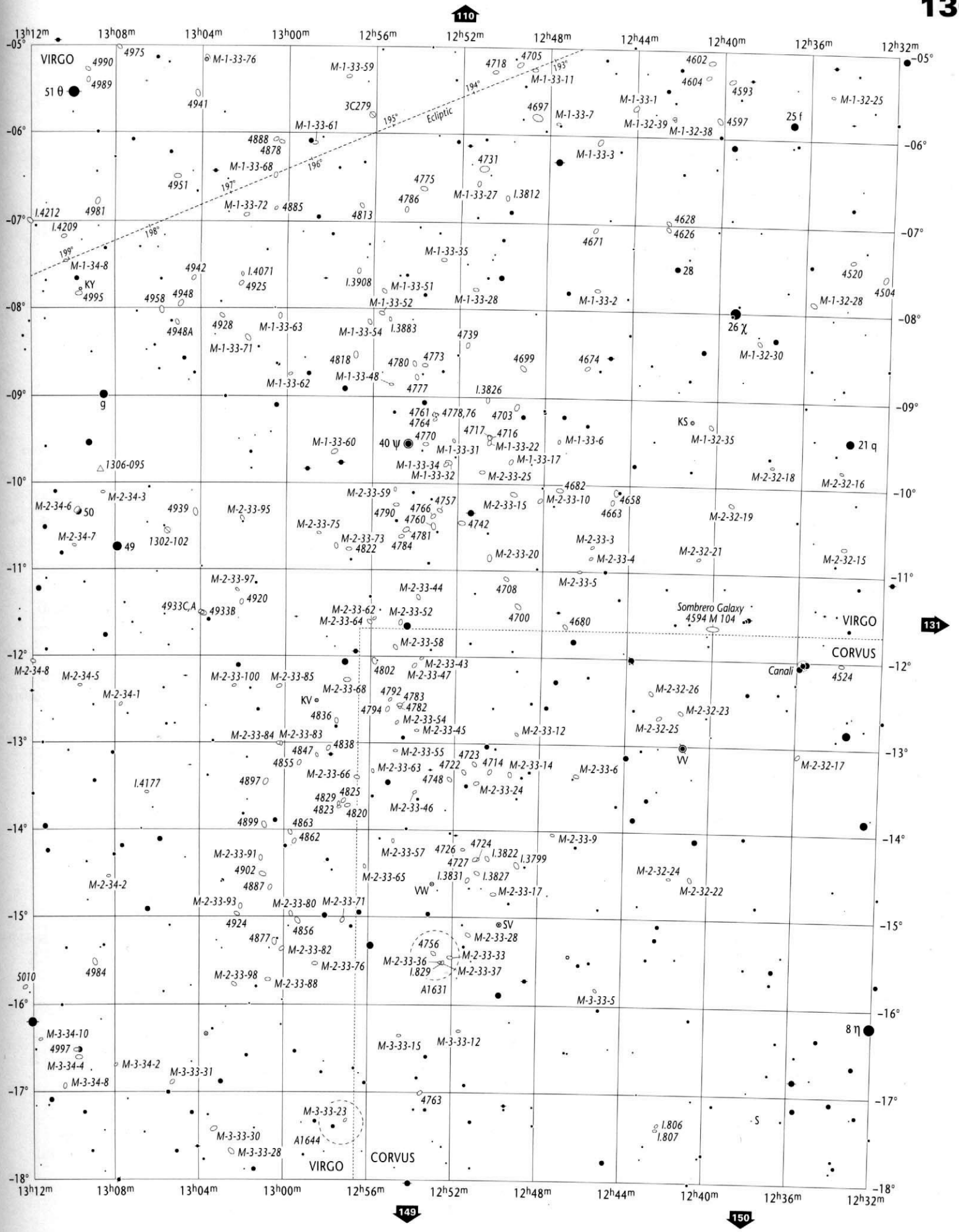
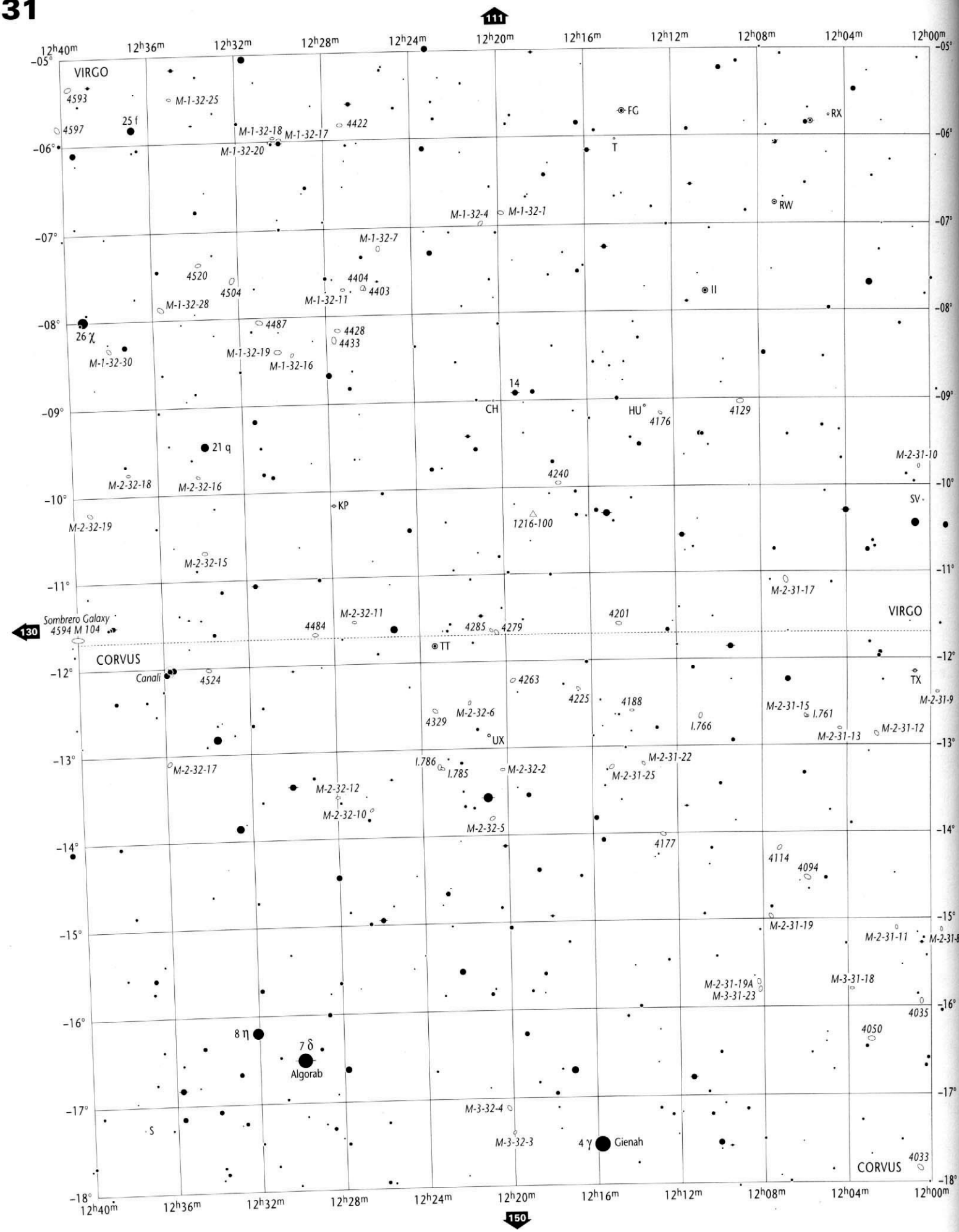


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale <5'	to scale <5'	>30" 30"-10" 10"-5" <5"	to scale 10'-5' <5'	>5' to scale; 5'-2' 2'-1' <1' major axis	to scale	**12h32m to 13h52m** **-05° to -18°**	**VIR** CRV

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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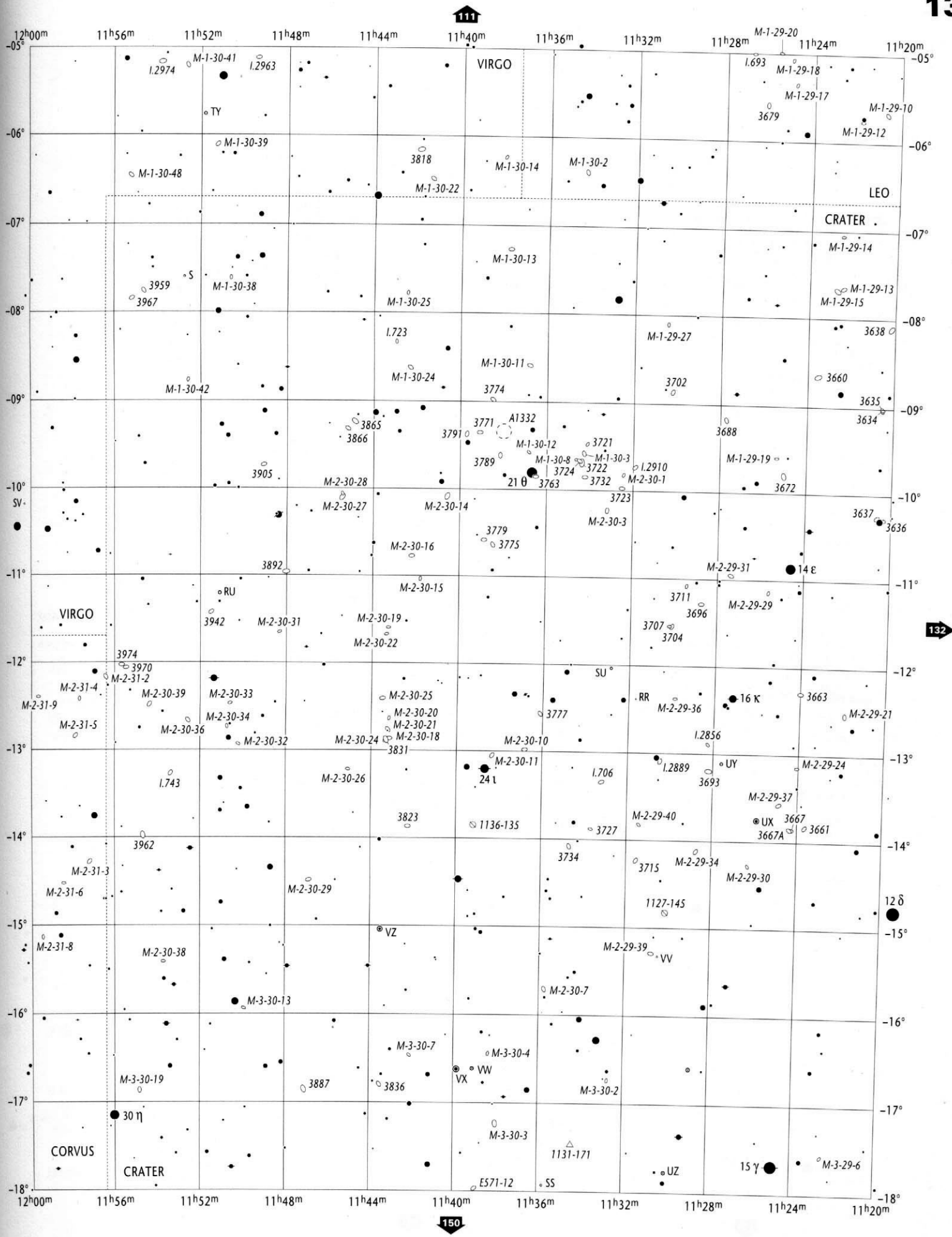
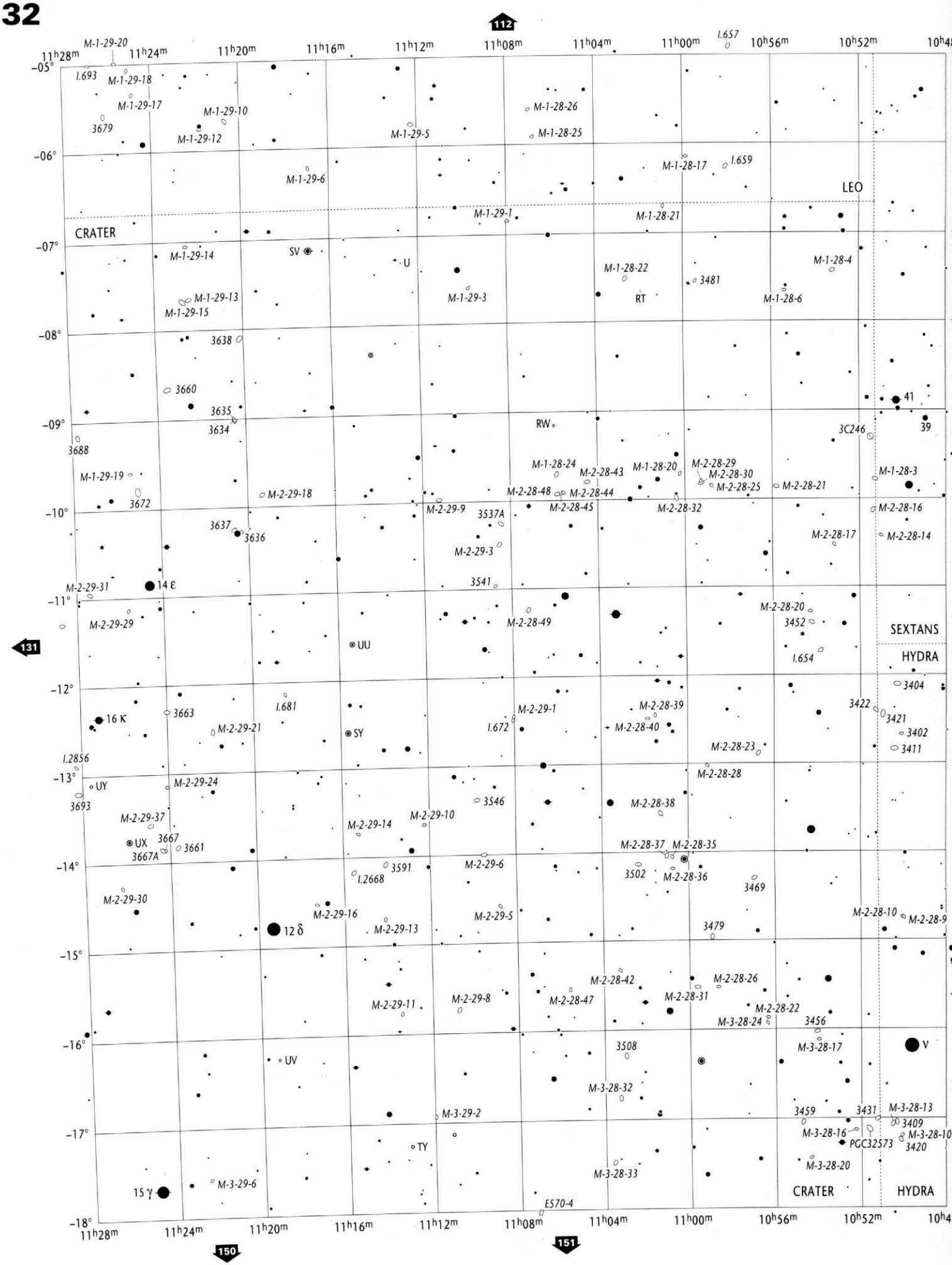


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30", 30"-10", 10"-5", < 5"	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

11h20m to 12h40m
-05° to -18°

CRT
VIR, CRV, LEO

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

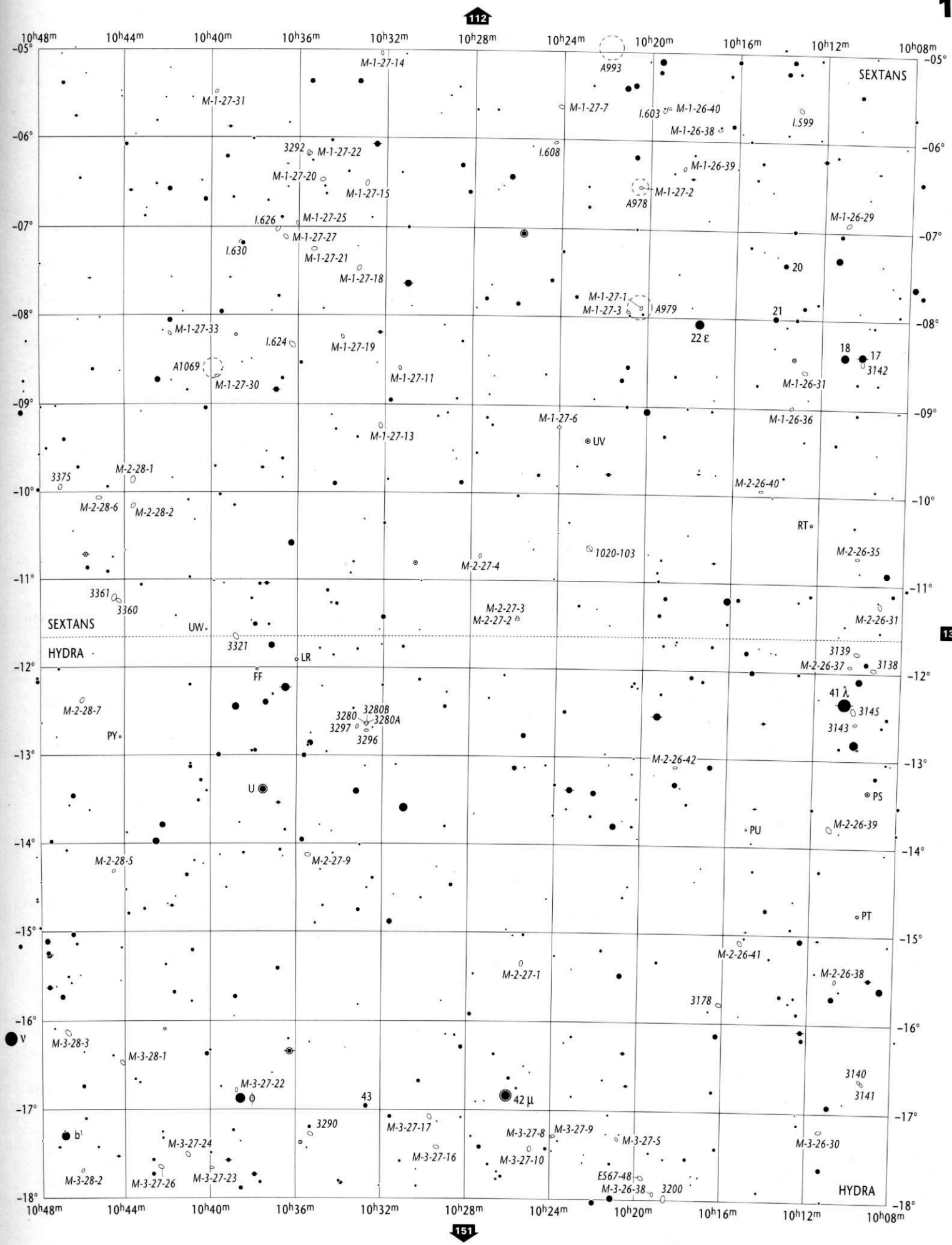
Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

Copyright © 1987-2001 Willmann-Bell, Inc.

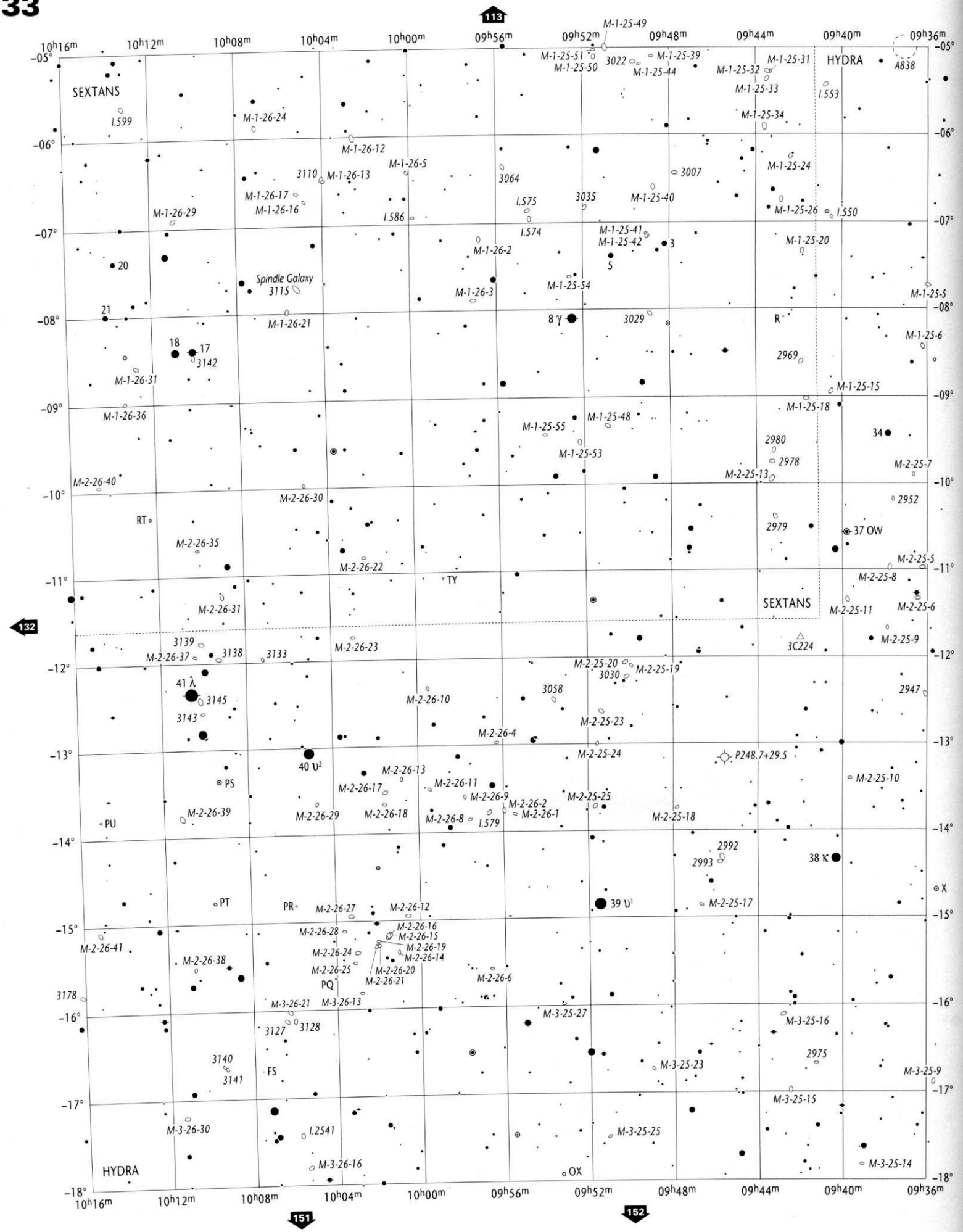


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30', 30'-10', 10'-5', < 5"	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

10h08m to 11h28m
-05° to -18°

CRT
SEX, HYA, LEO

Wil Tirion / Barry Rappaport / Will Rema



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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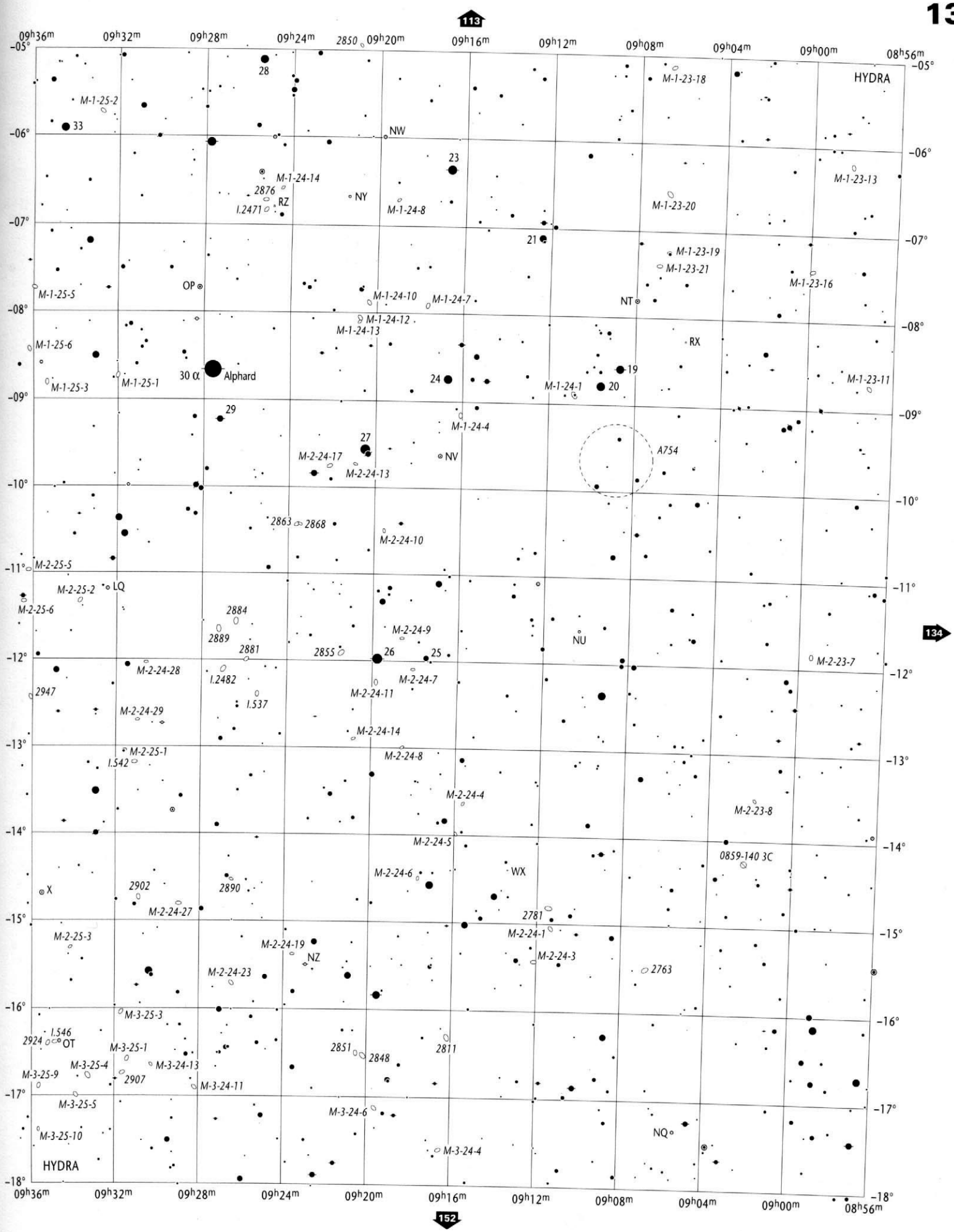


Open Star Clusters and Asterisms — to scale, < 5'

Globular Star Clusters — to scale, < 5'

Planetary Nebulae — >30", 30"-10", 10"-5", < 5"

Bright & Dark Nebulae — to scale, 10' - 5', < 5'

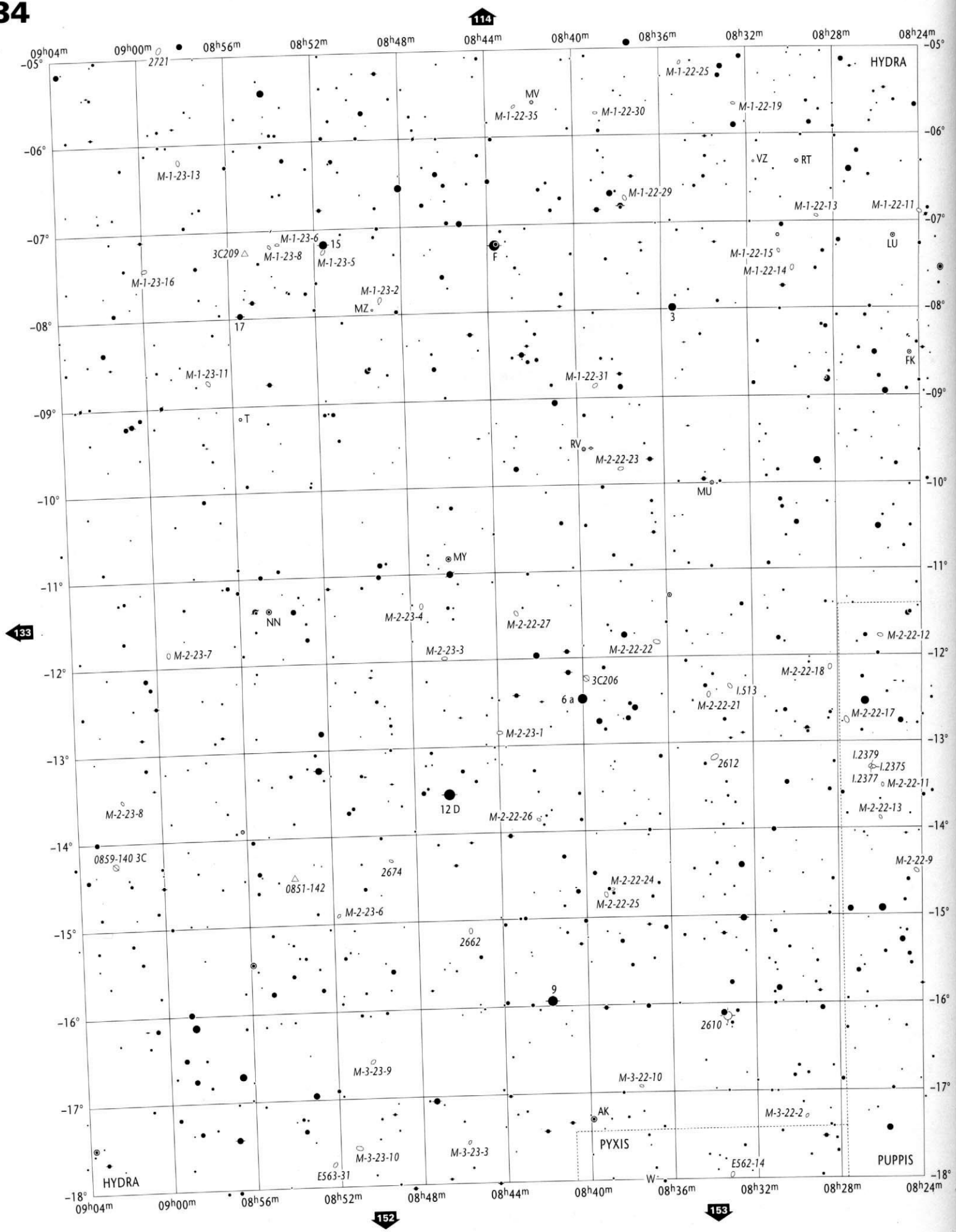
Galaxies — > 5' to scale; 5'-2', 2'-1', < 1' major axis

Galaxy Cluster — to scale

08h56m to 10h16m
-05° to -18°

HYA
SEX

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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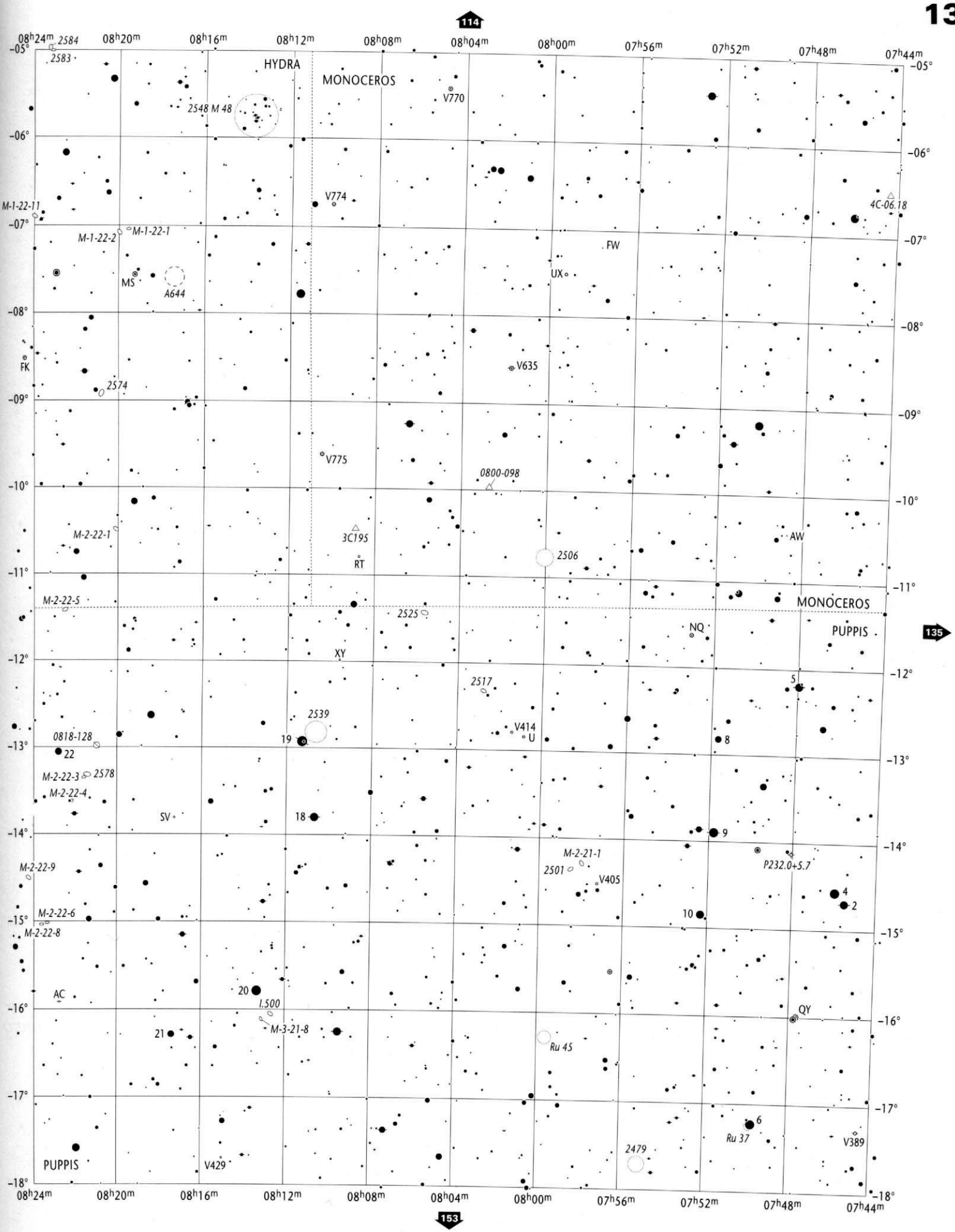
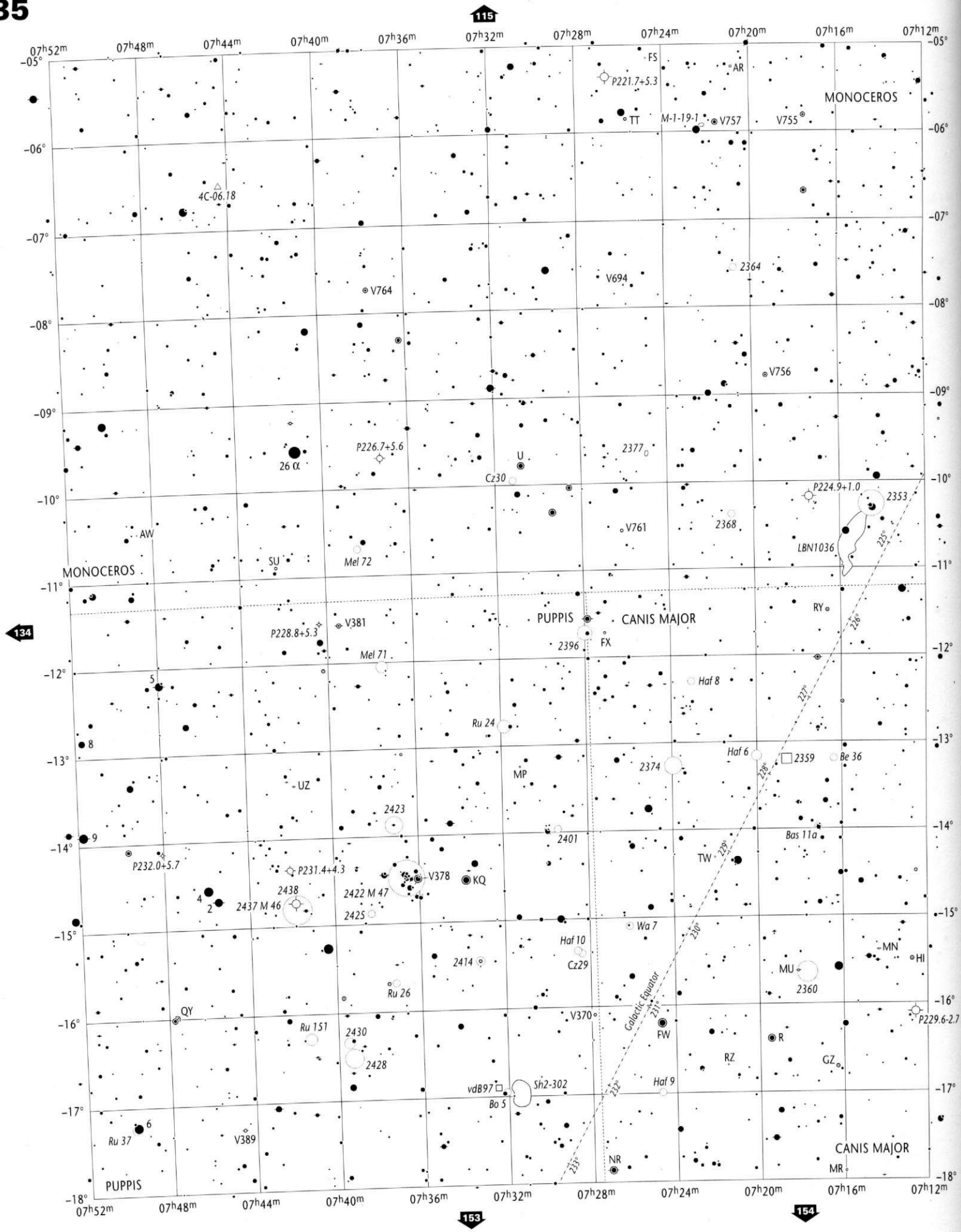


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

07h44m to 09h04m
-05° to -18°

HYA
PUP, MON, PYX

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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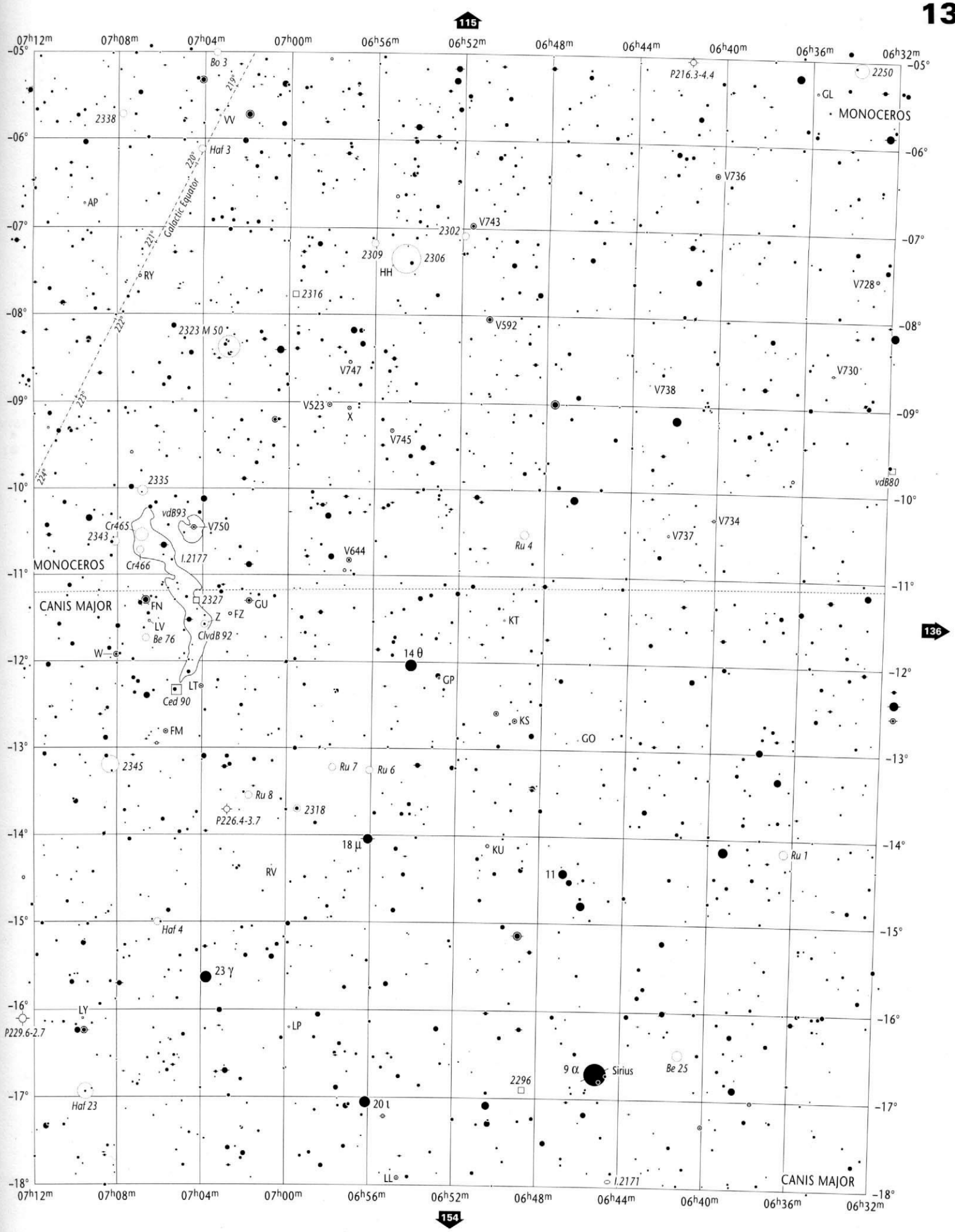
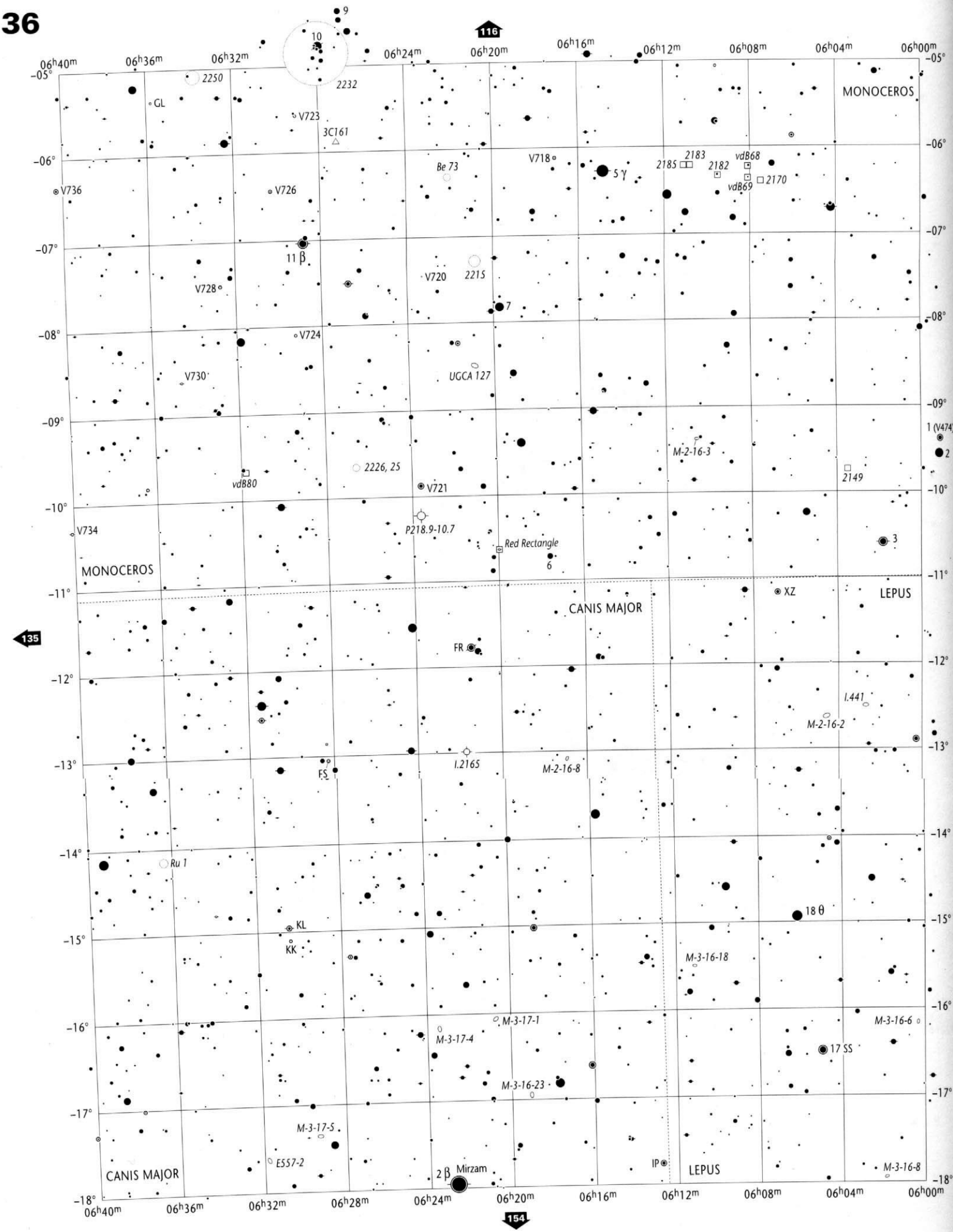


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

06h32m to 07h52m
-05° to -18°

MON
CMA, PUP

Wil Tirion / Barry Rappaport / Will Remaklu



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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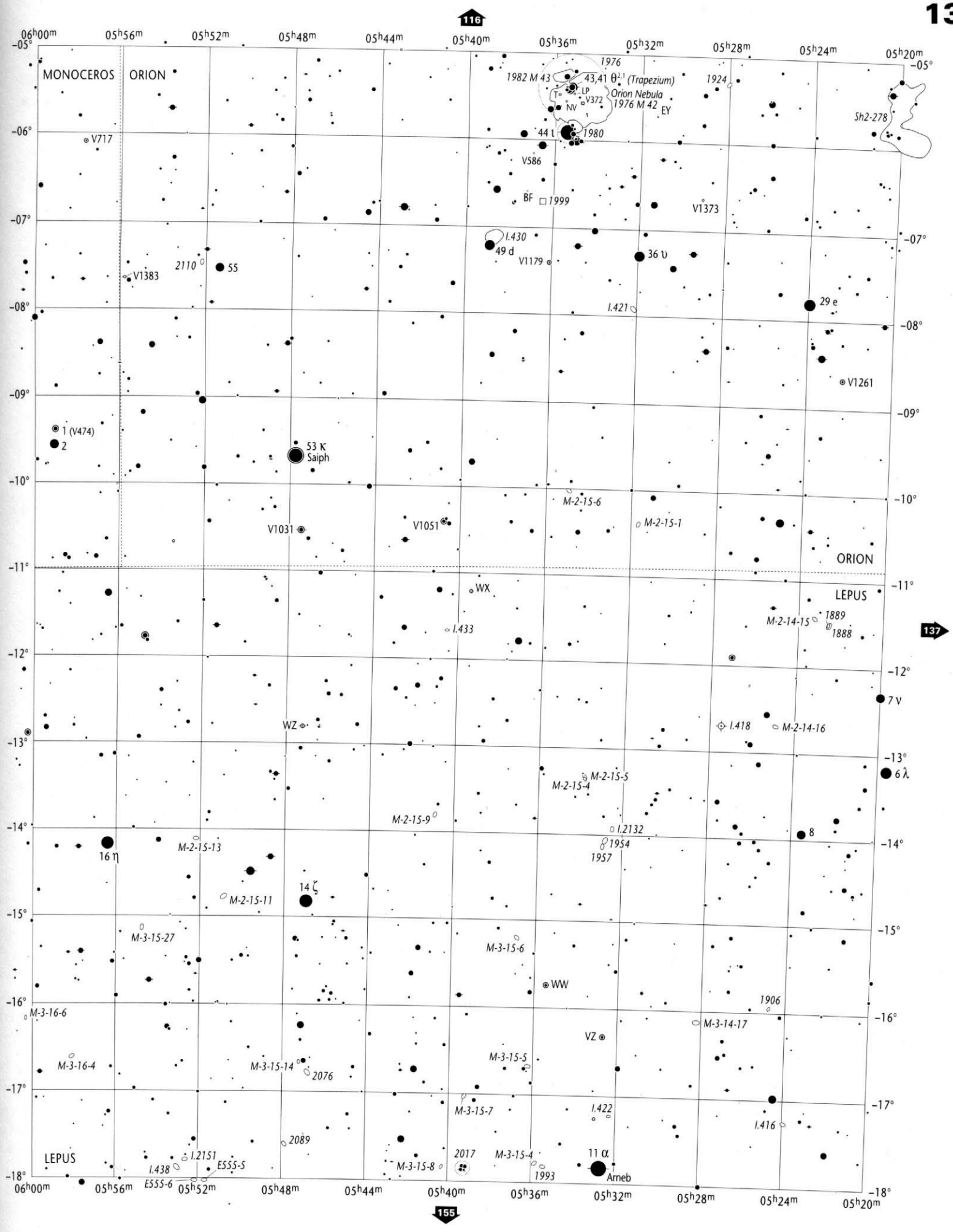
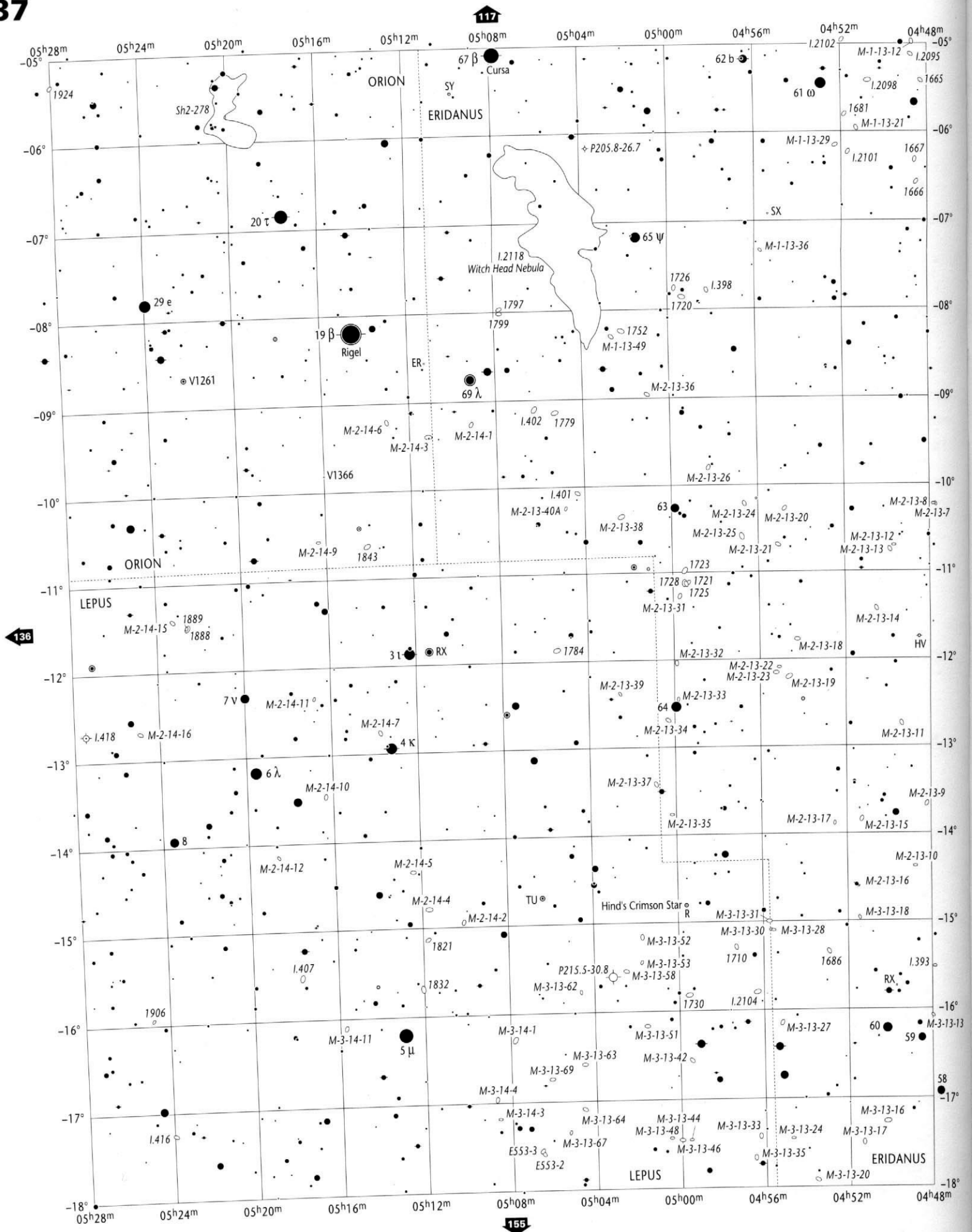


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

05h20m to 06h40m
-05° to -18°

LEP
MON, ORI, CMA

Wil Tirion / Barry Rappaport / Will Remaklus



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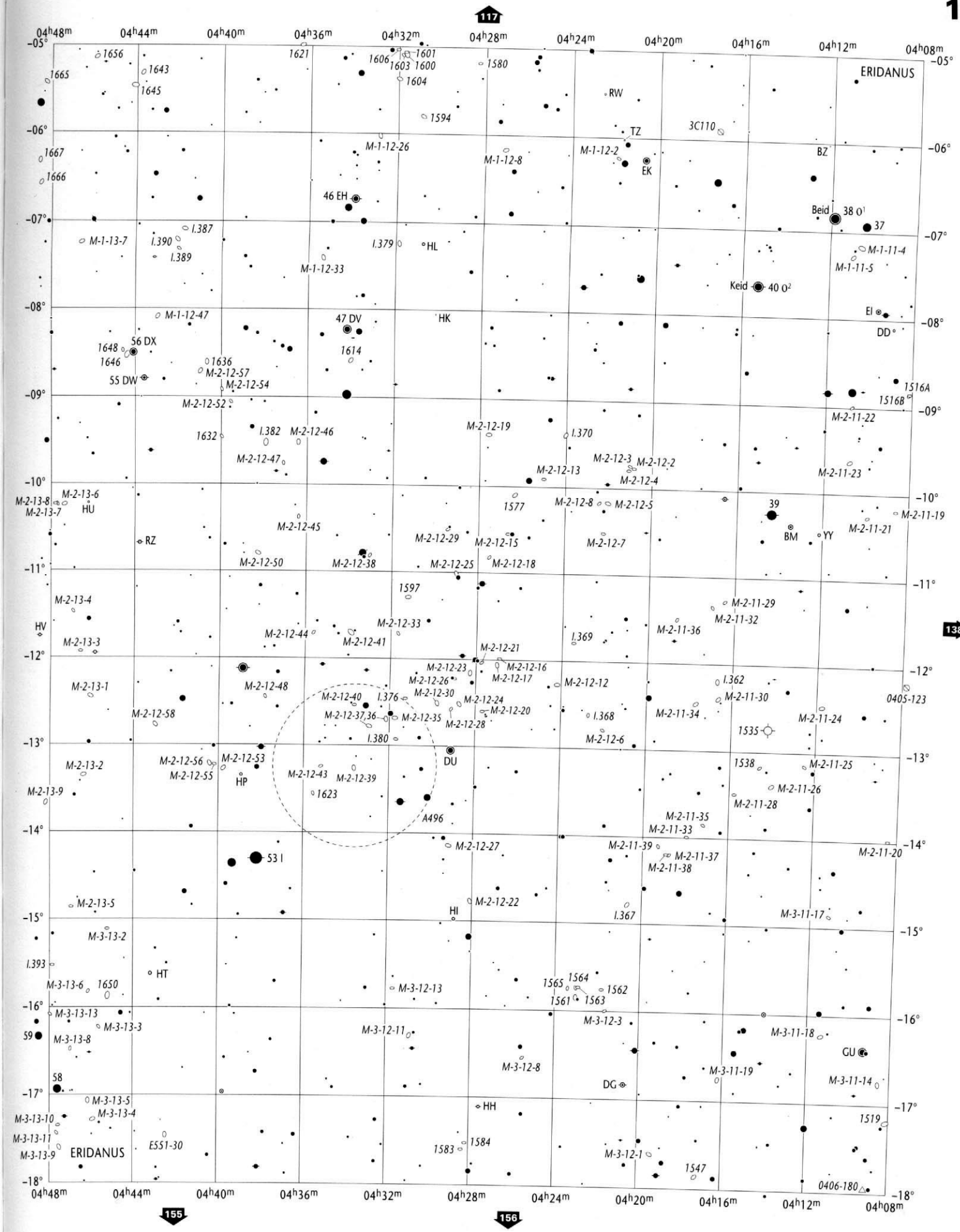
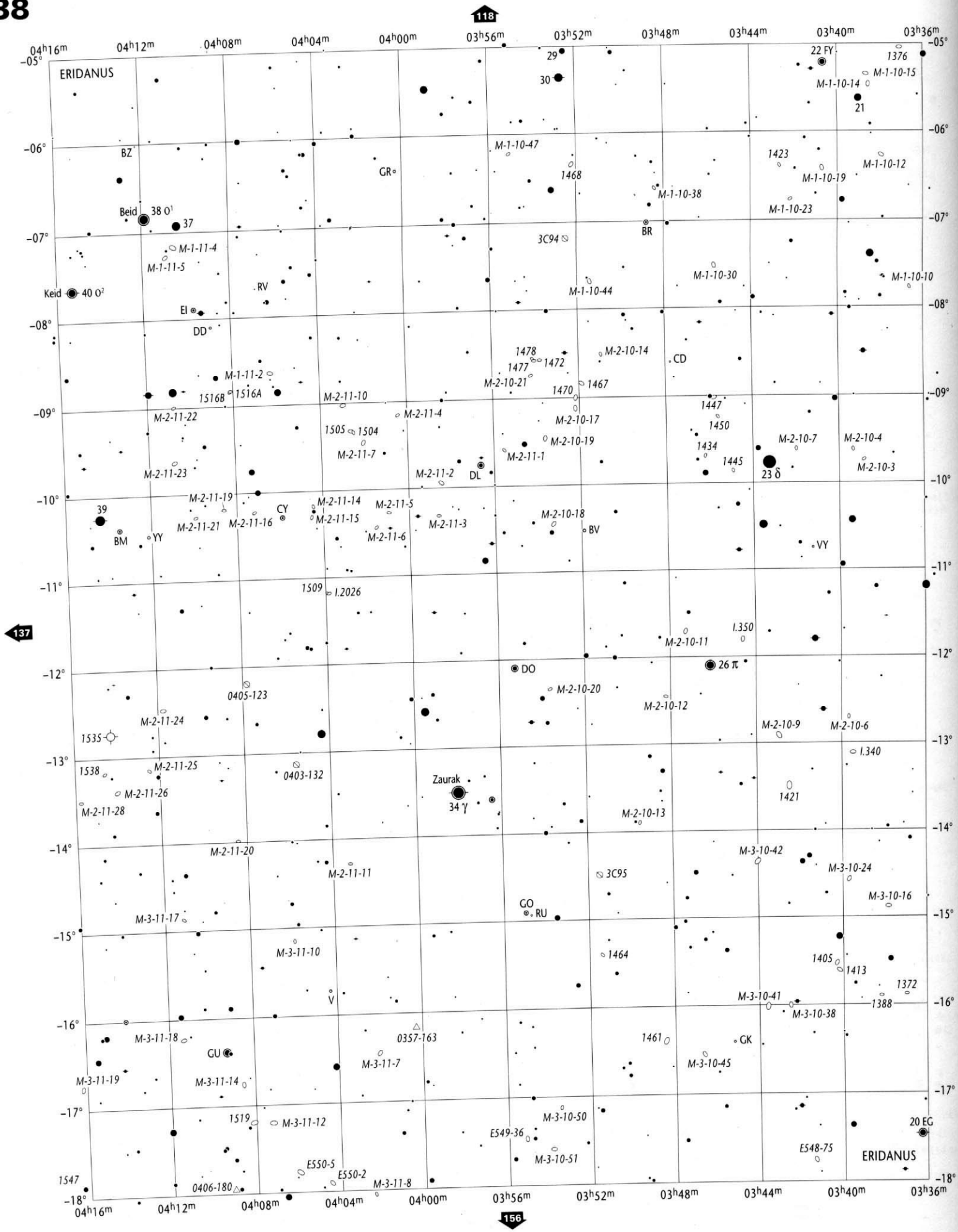


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale <5'	to scale <5'	>30" 30"-10" 10"-5" <5"	to scale 10'-5' <5'	>5' to scale 5'-2' 2'-1' <1' major axis	to scale	**04h08m to 05h28m** **-05° to -18°**	**ERI** LEP, ORI

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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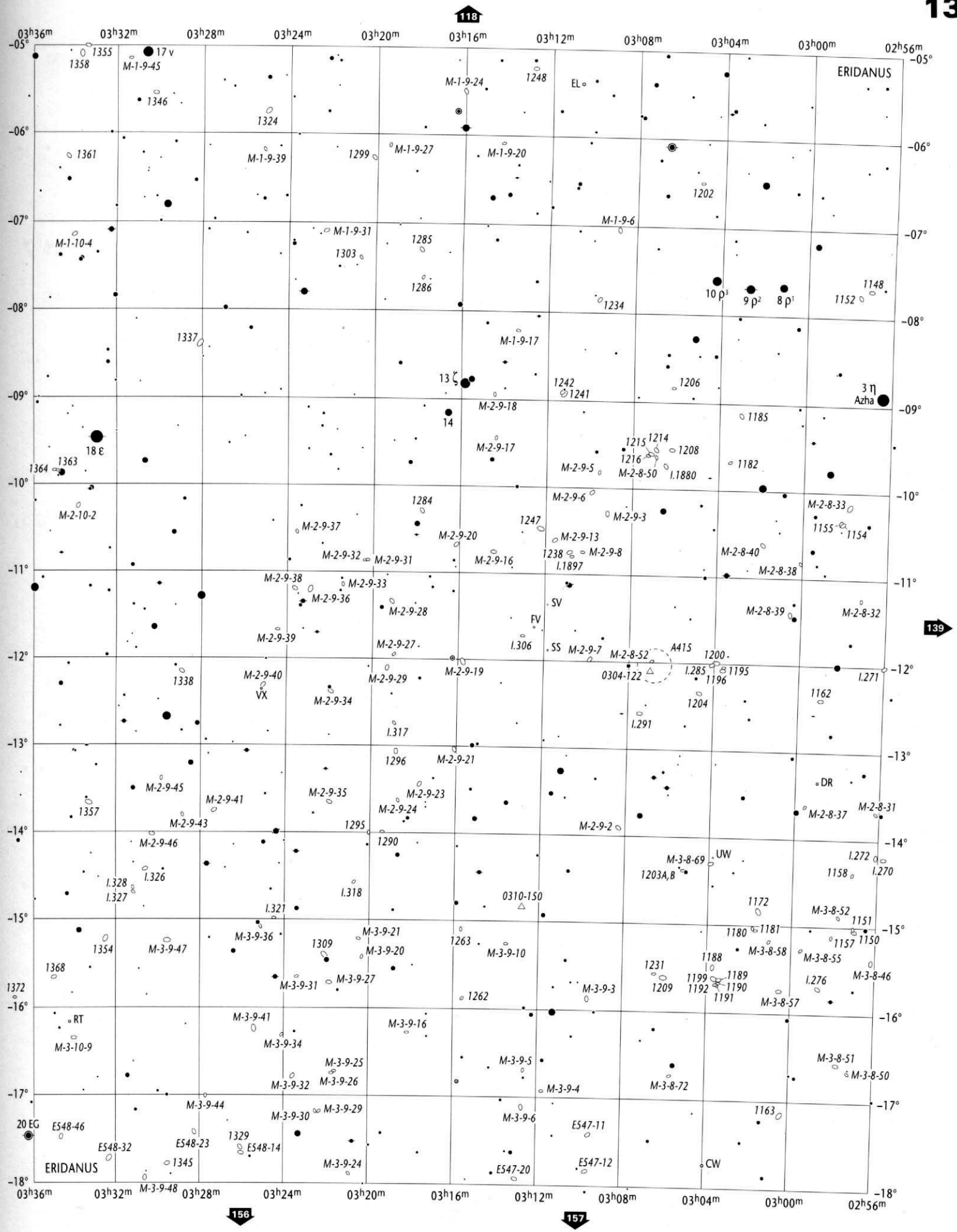
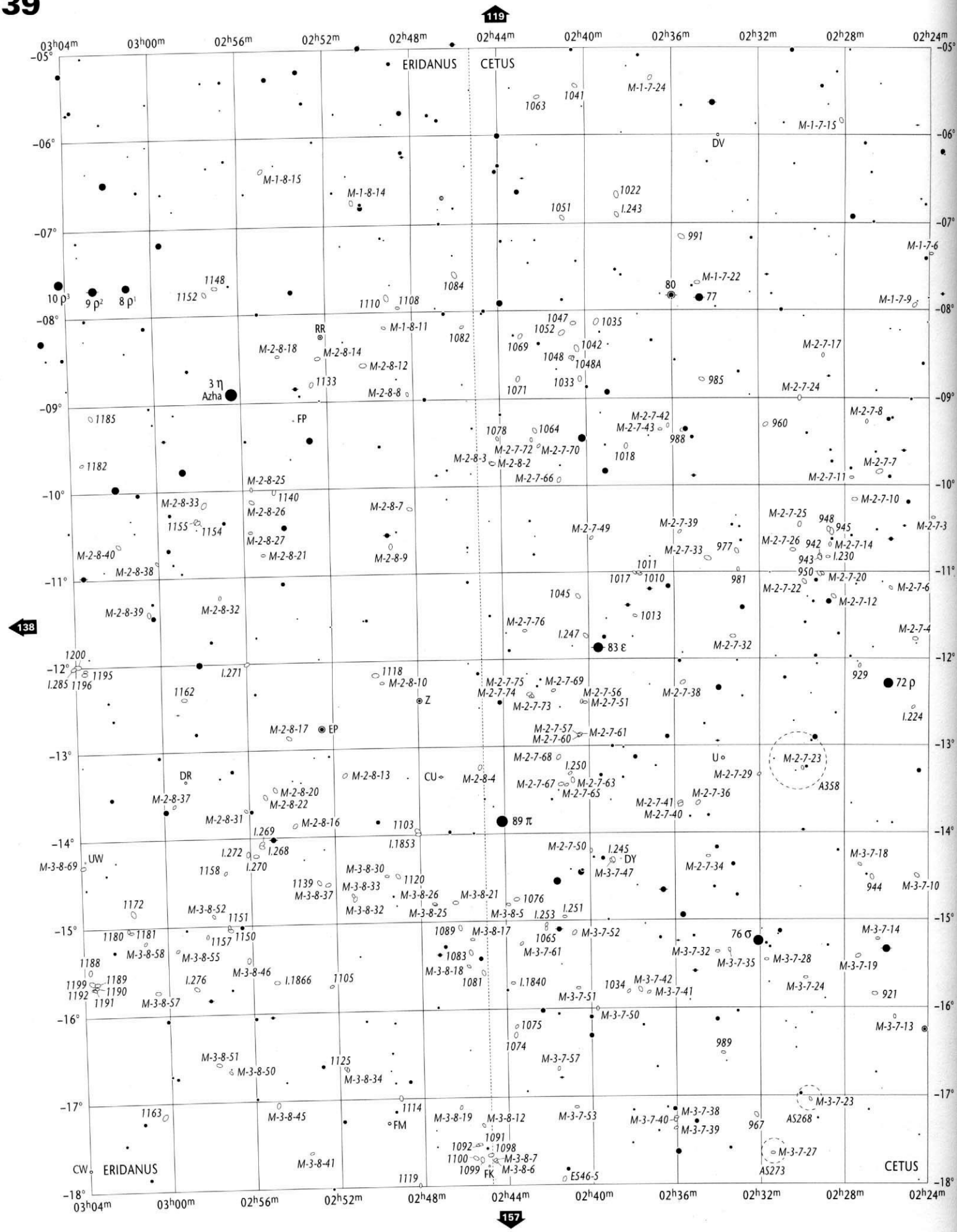


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

02h56m to 04h16m
-05° to -18°

ERI

Will Tirion / Barry Rappaport / Will Remaklus


119
138
157
ERIDANUS
CETUS
CW
03h04m
03h00m
02h56m
02h52m
02h48m
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02h40m
02h36m
02h32m
02h28m
02h24m
-05°
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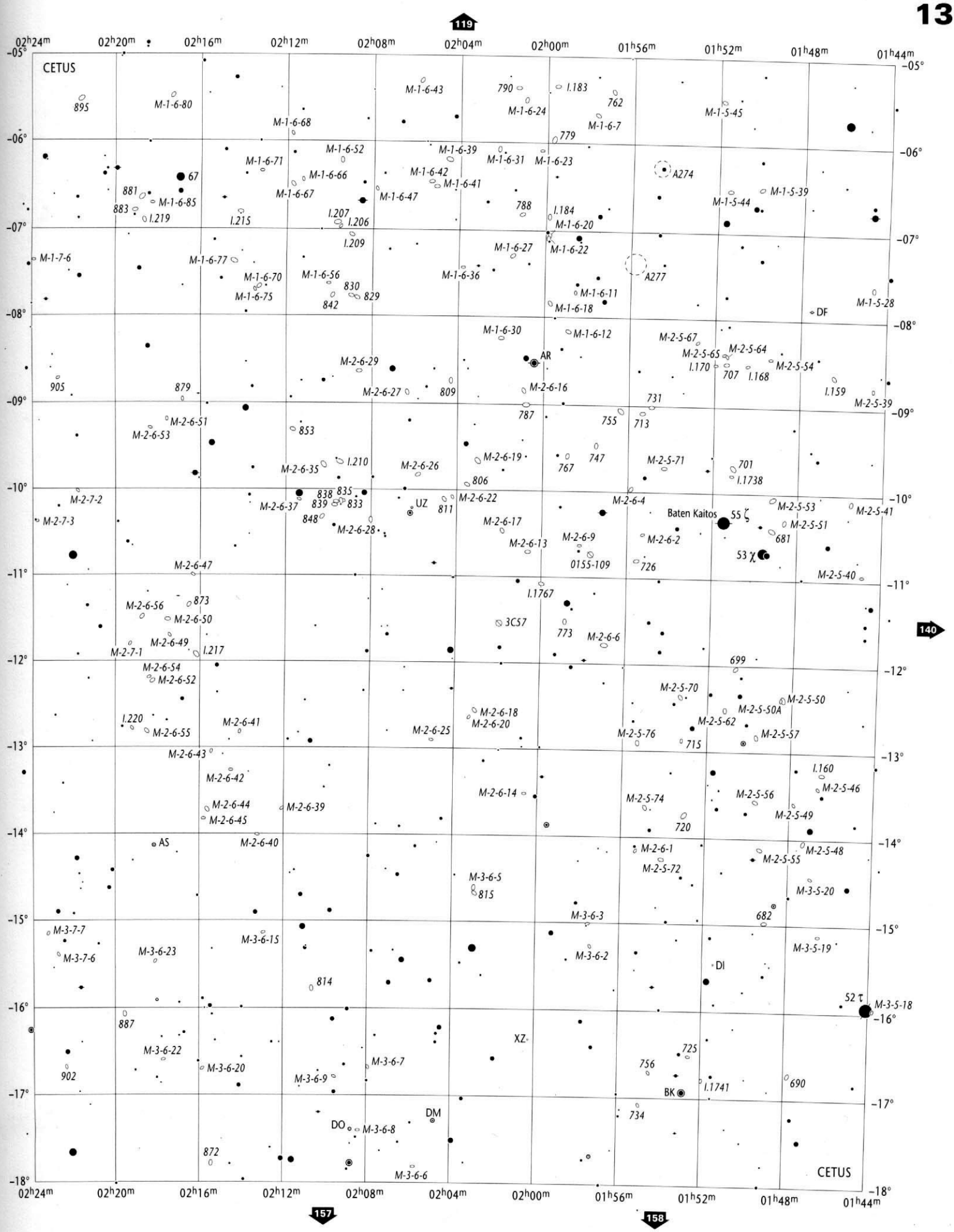
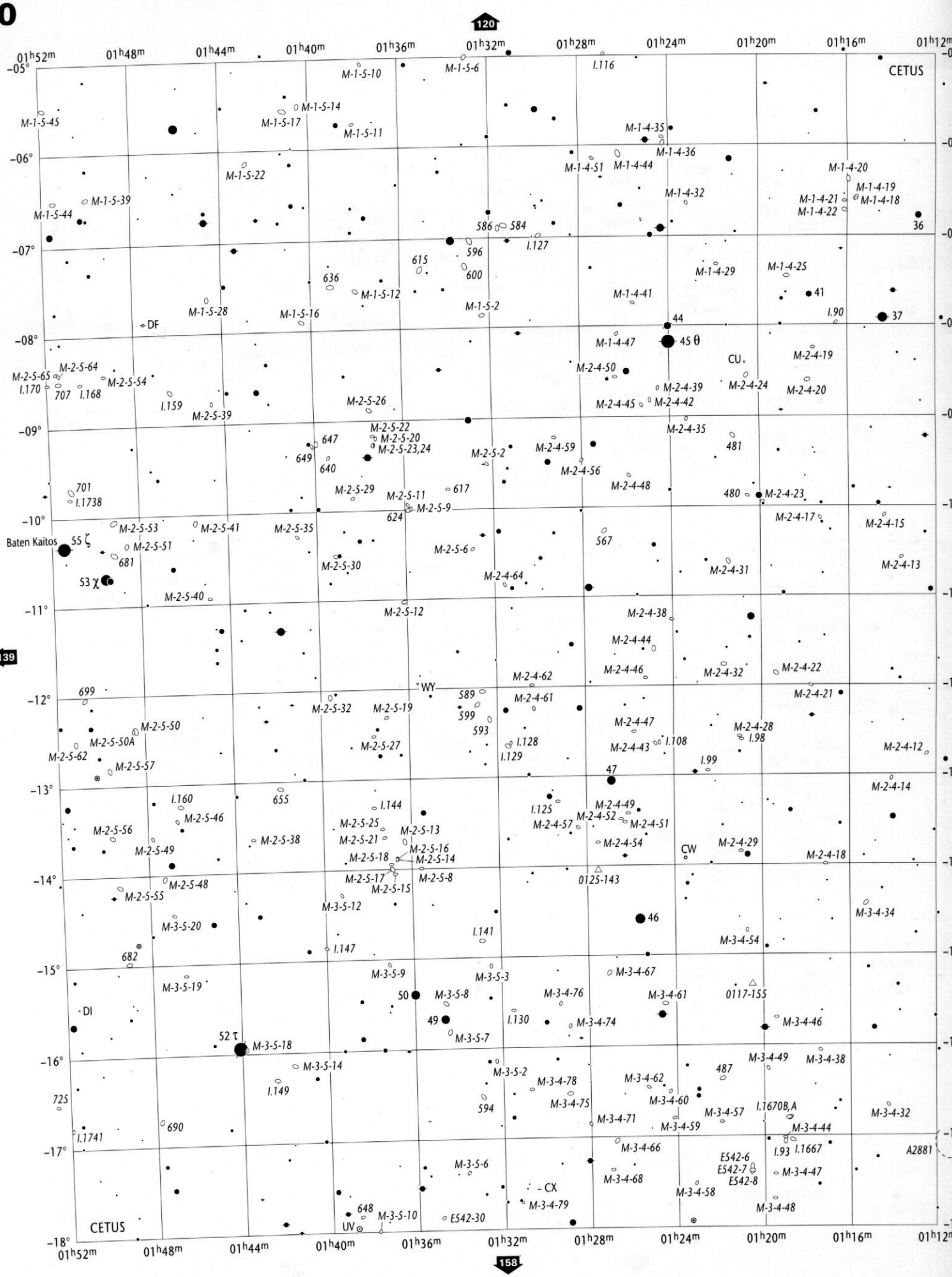


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale · < 5'	to scale · < 5'	>30" · 30"-10" · 10"-5" · < 5"	to scale · 10' - 5' · < 5'	> 5' to scale · 5'-2' · 2'-1' · < 1' major axis	to scale

01h44m to 03h04m
-05° to -18°

CET
ERI

Will Tirion / Barry Rappaport / Will Remaklu



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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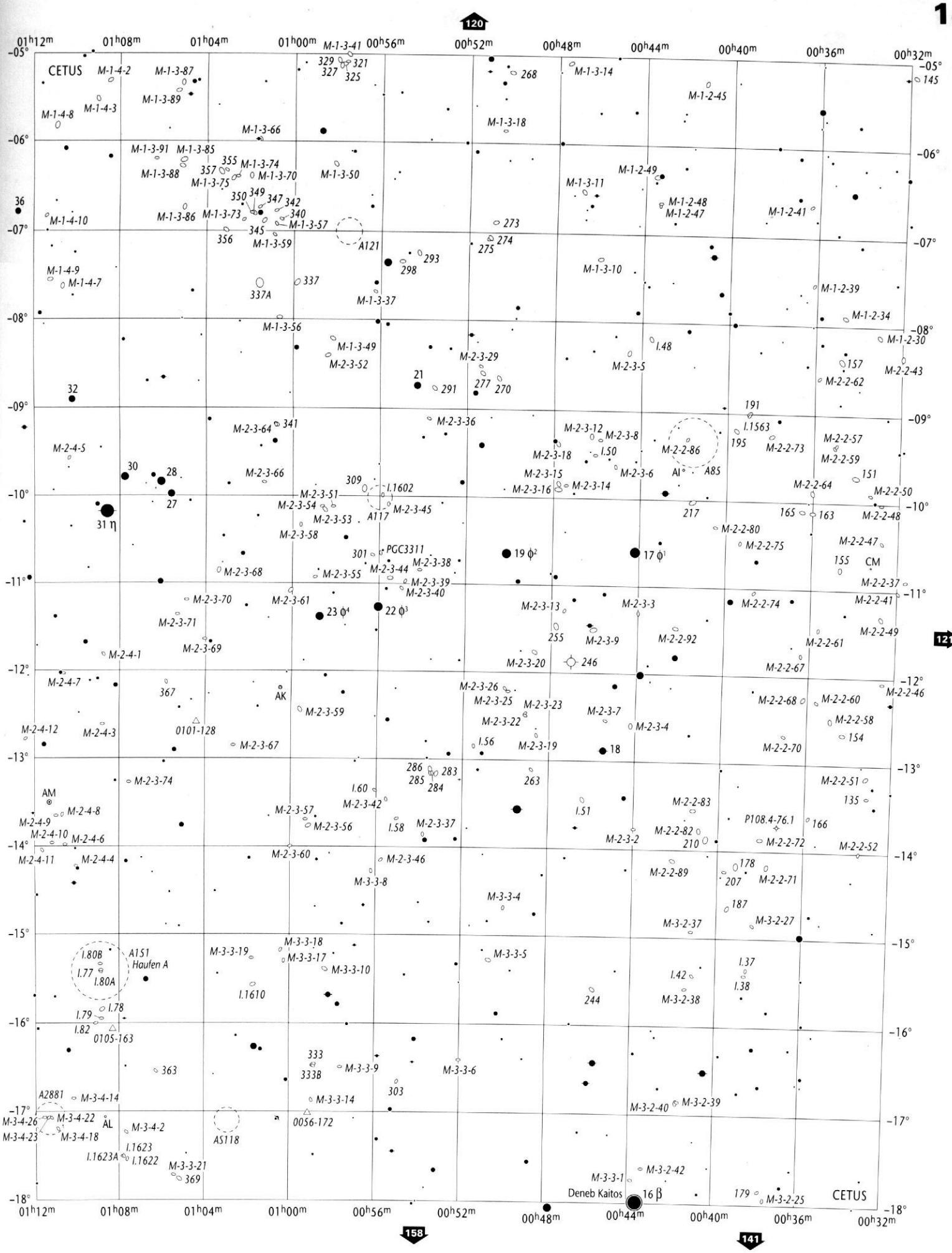
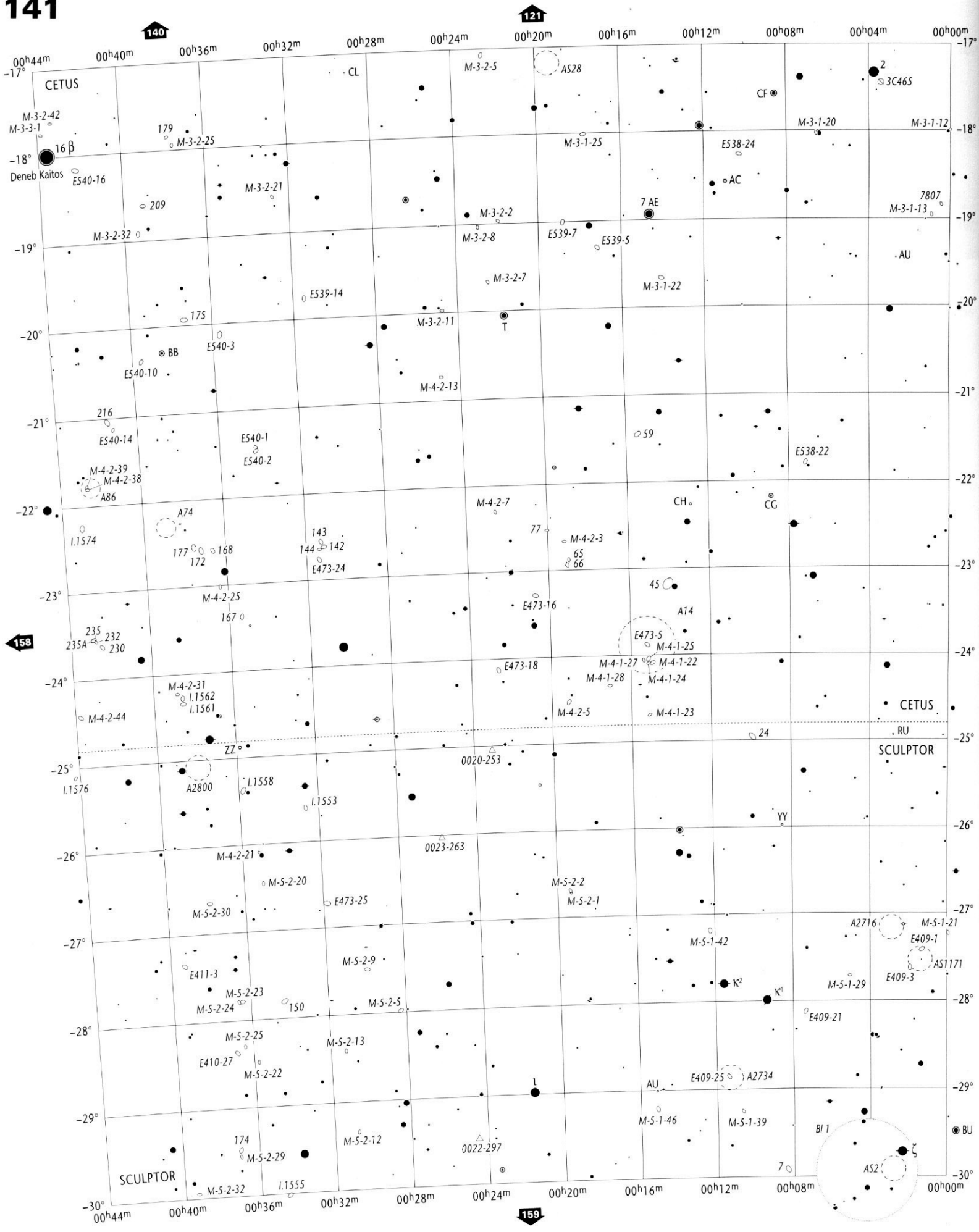


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale

00h32m to 01h52m
-05° to -18°

CET

Will Tirion / Barry Rappaport / Will Kerna



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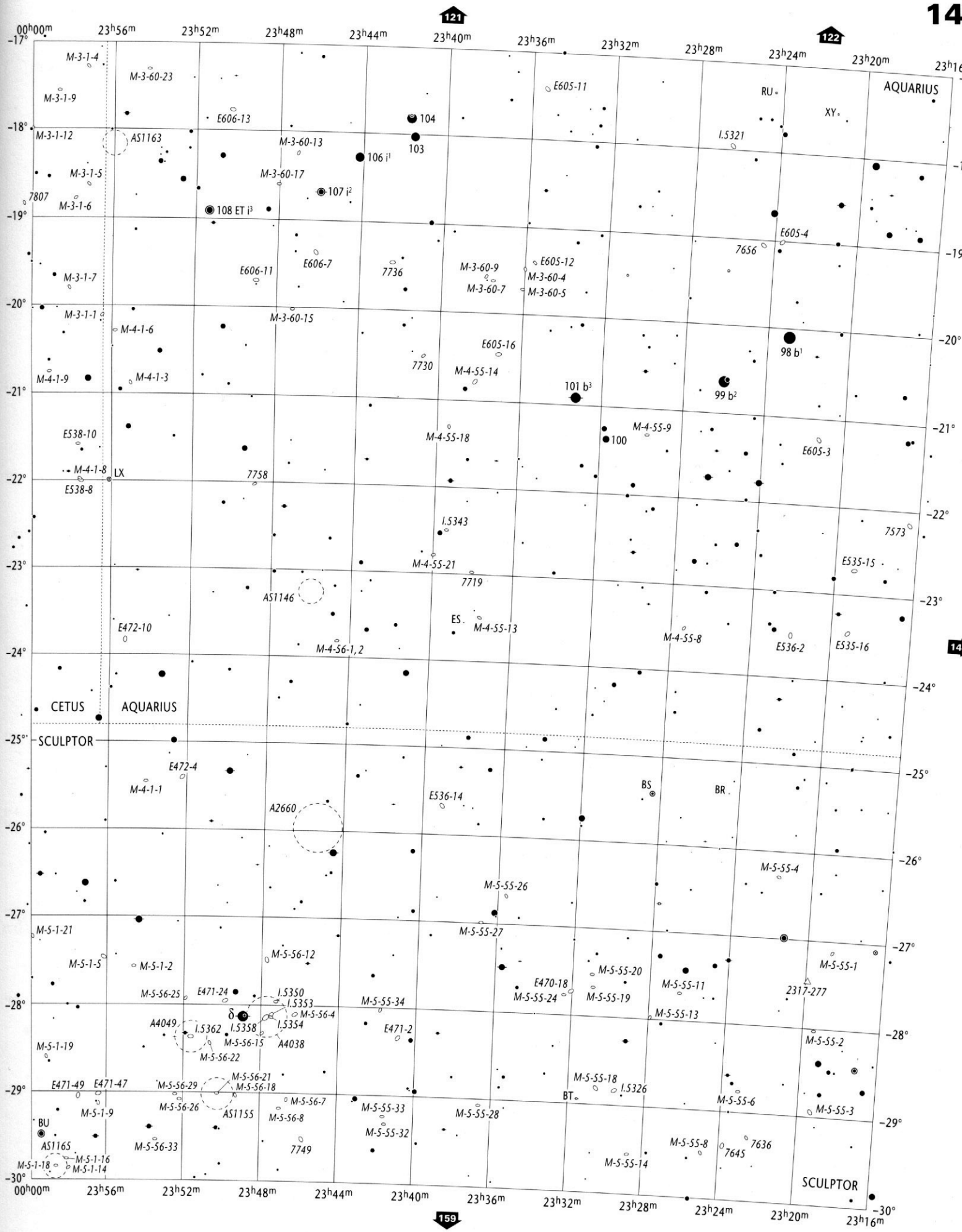
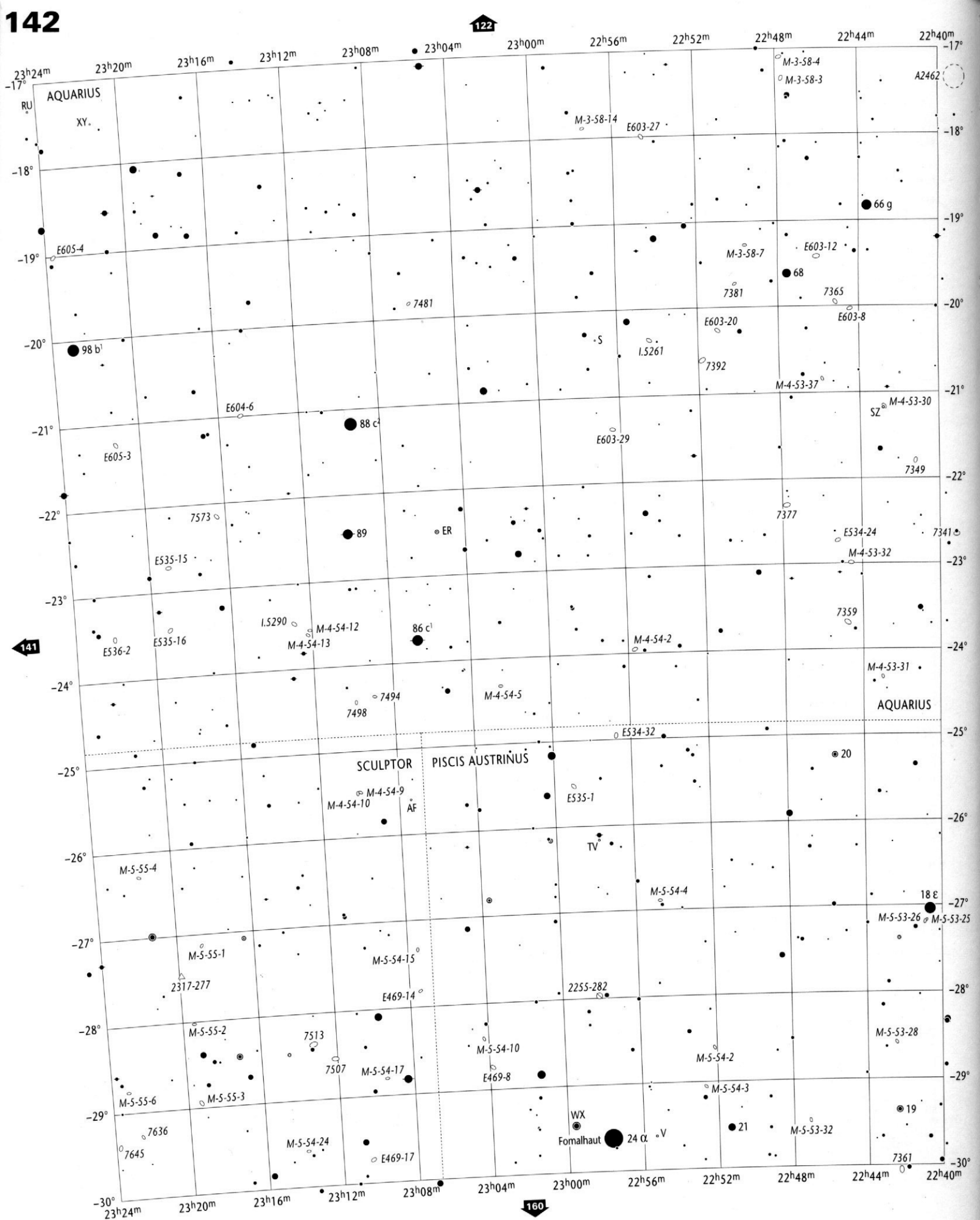


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	**00h44m to 23h16m -17° to -30°**	**SCL CET, AQR**

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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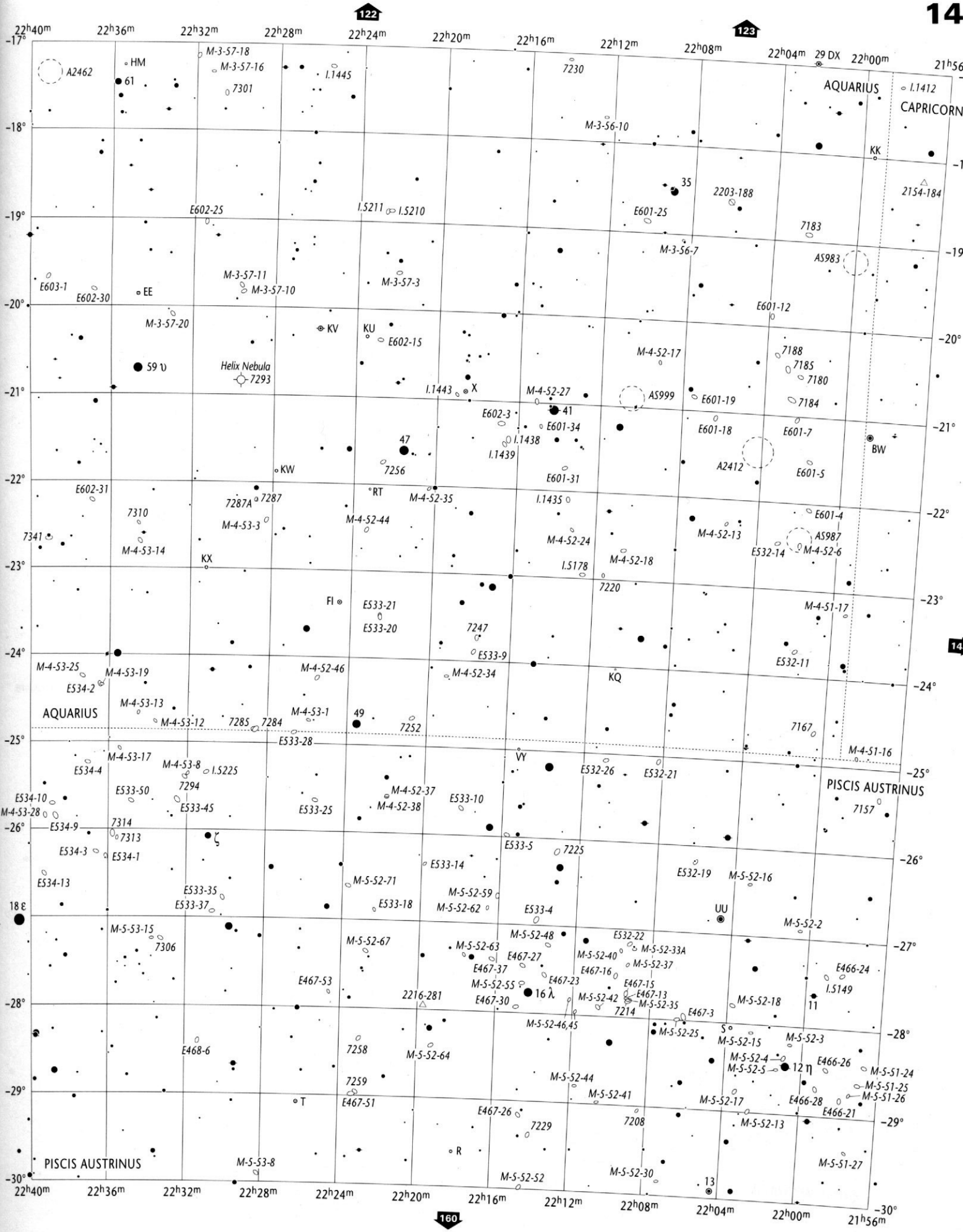
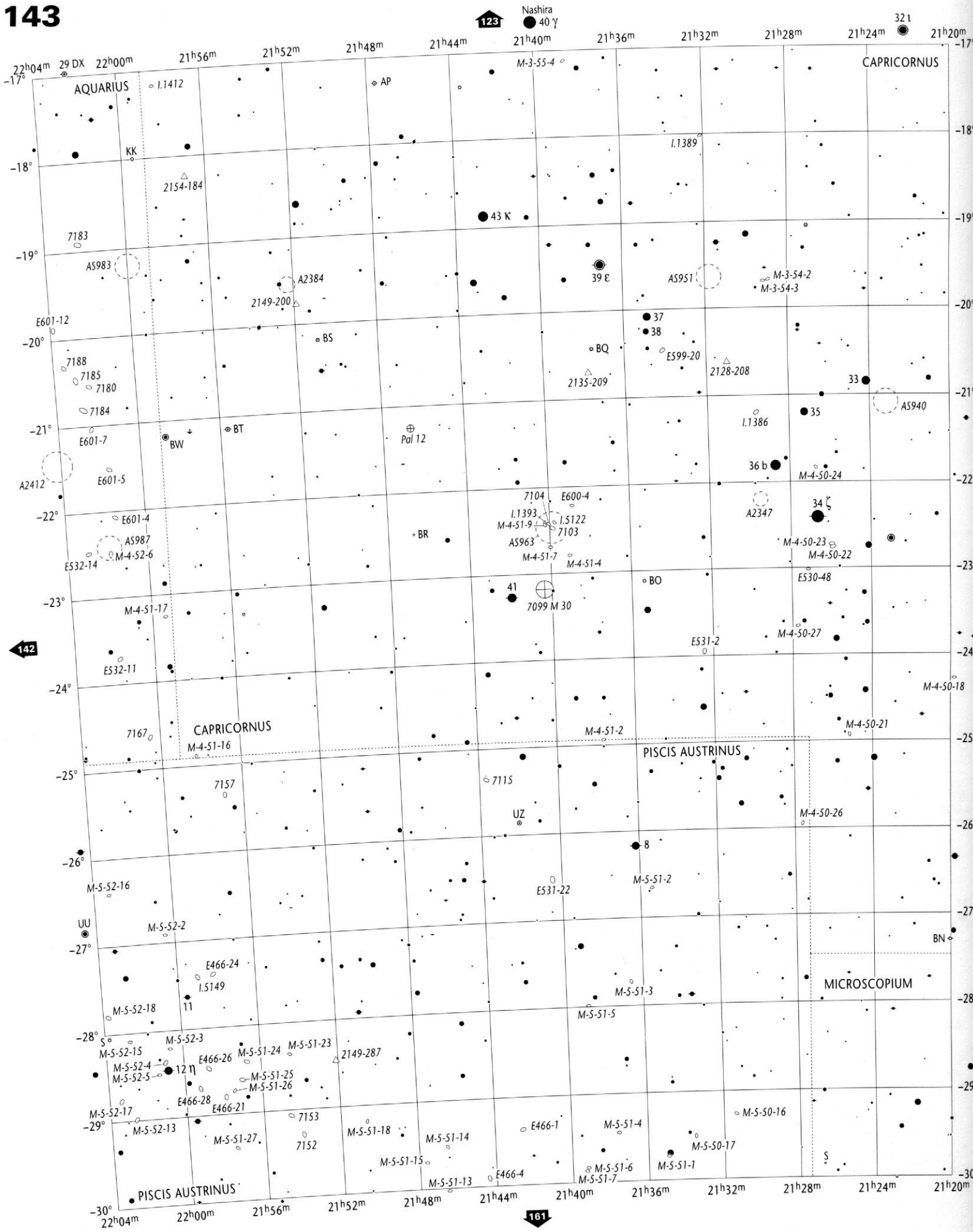


21h56m to 23h24m
-17° to -30°

AQR
PSA, SCL, CAP

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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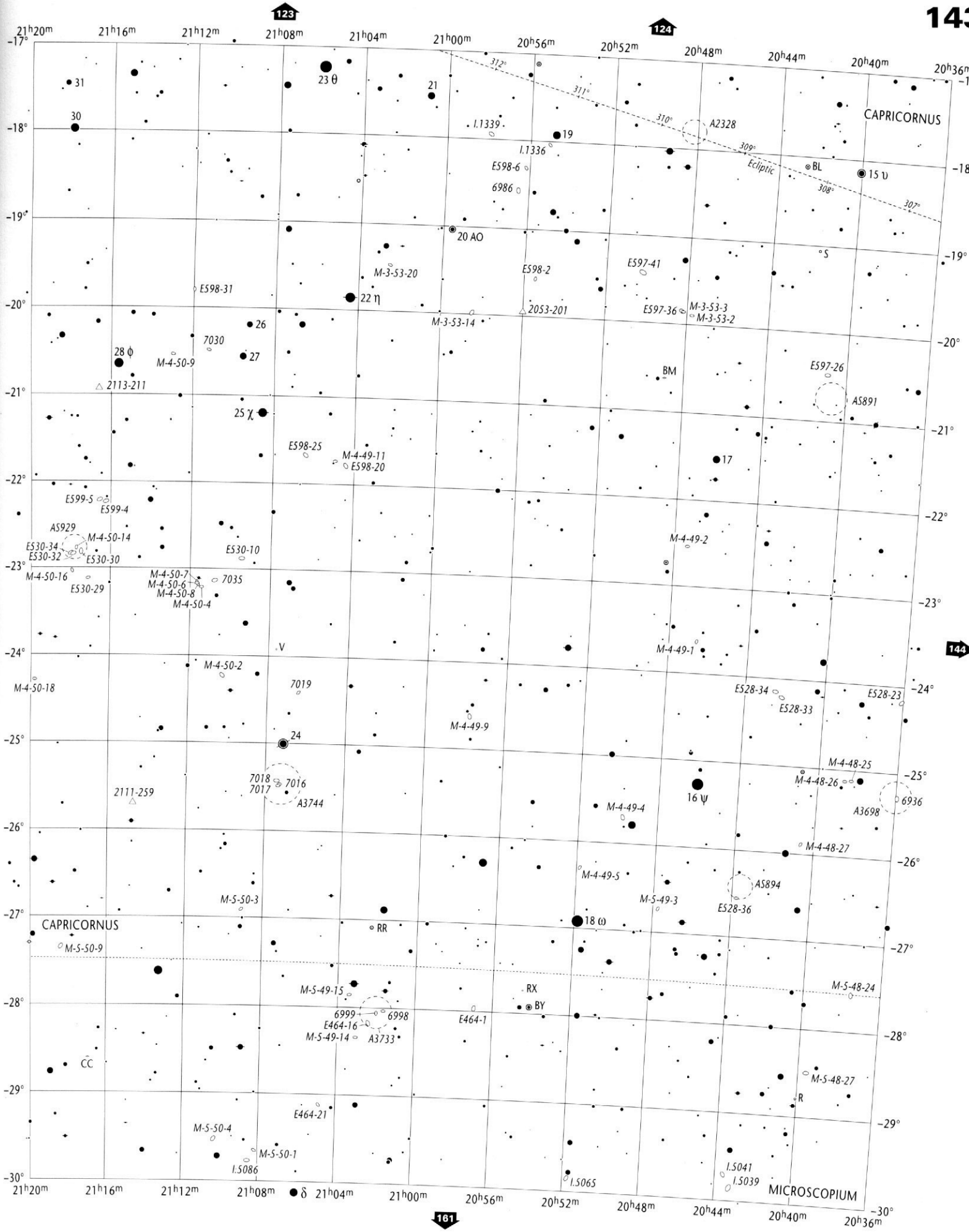
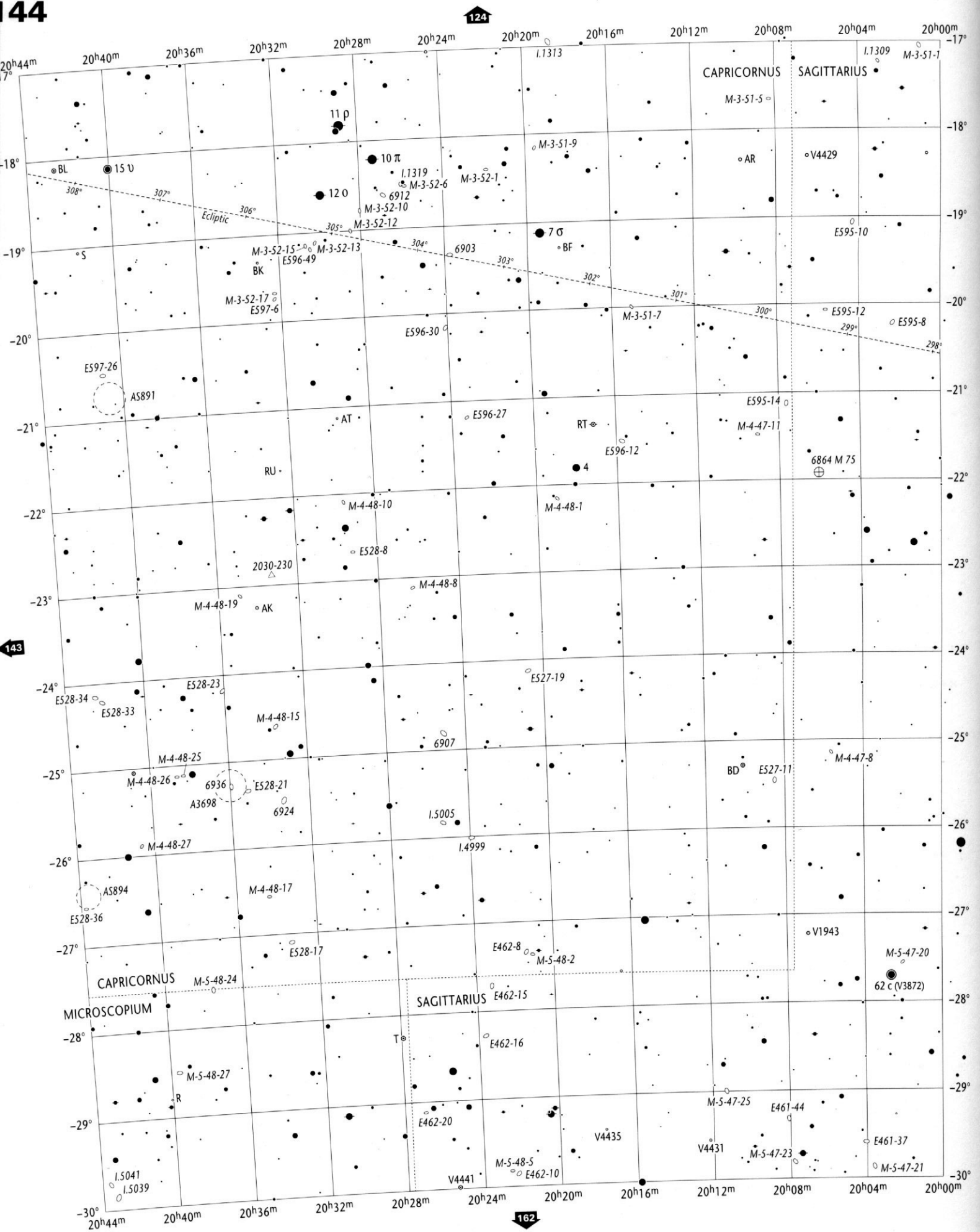


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5′	to scale, < 5′	>30″, 30″-10″, 10″-5″, < 5″	to scale, 10′ - 5′, < 5′	> 5′ to scale; 5′-2′, 2′-1′, < 1′ major axis	to scale

20h36m to 22h04m
−17° to −30°

CAP
PSA, MIC, AQR

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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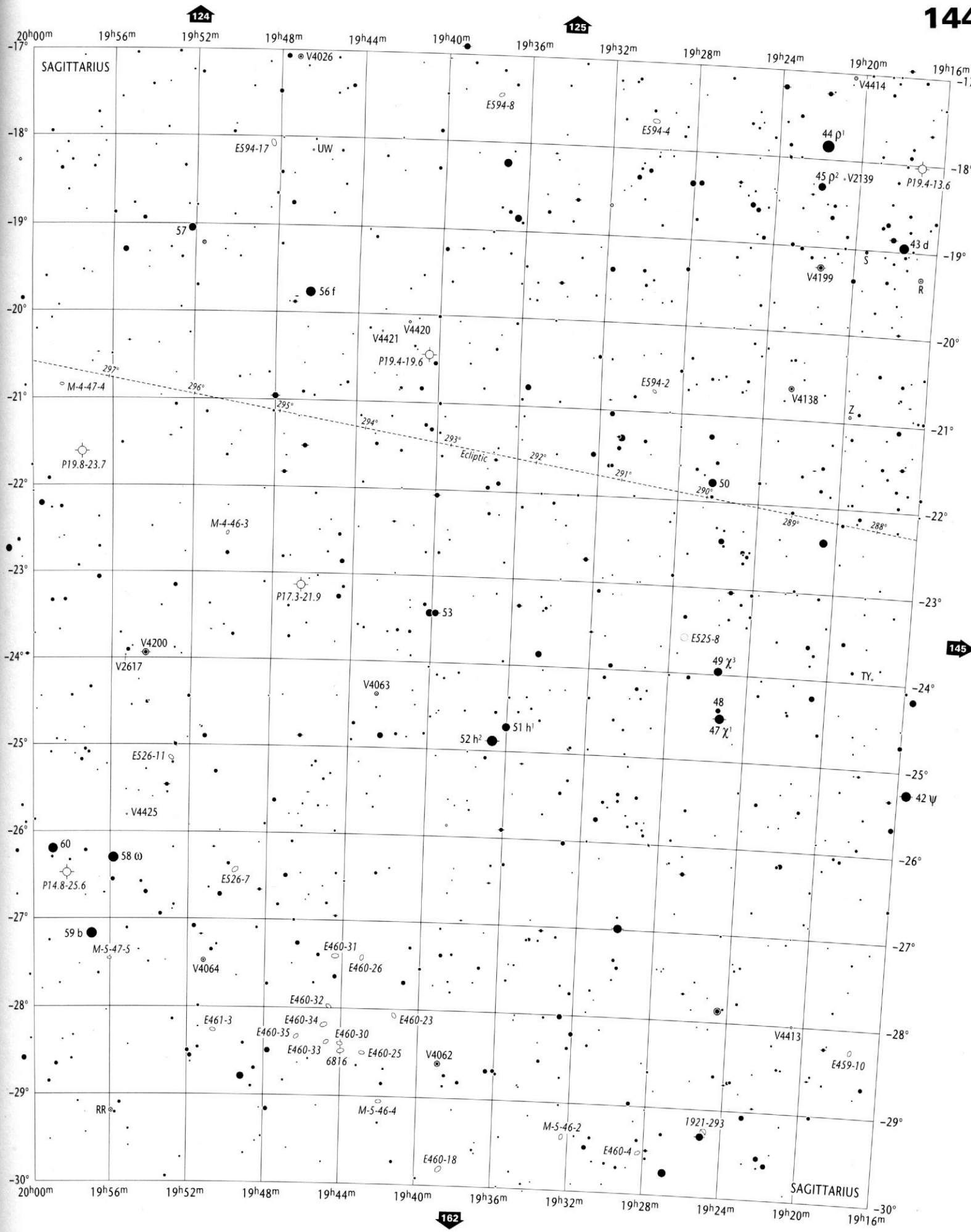
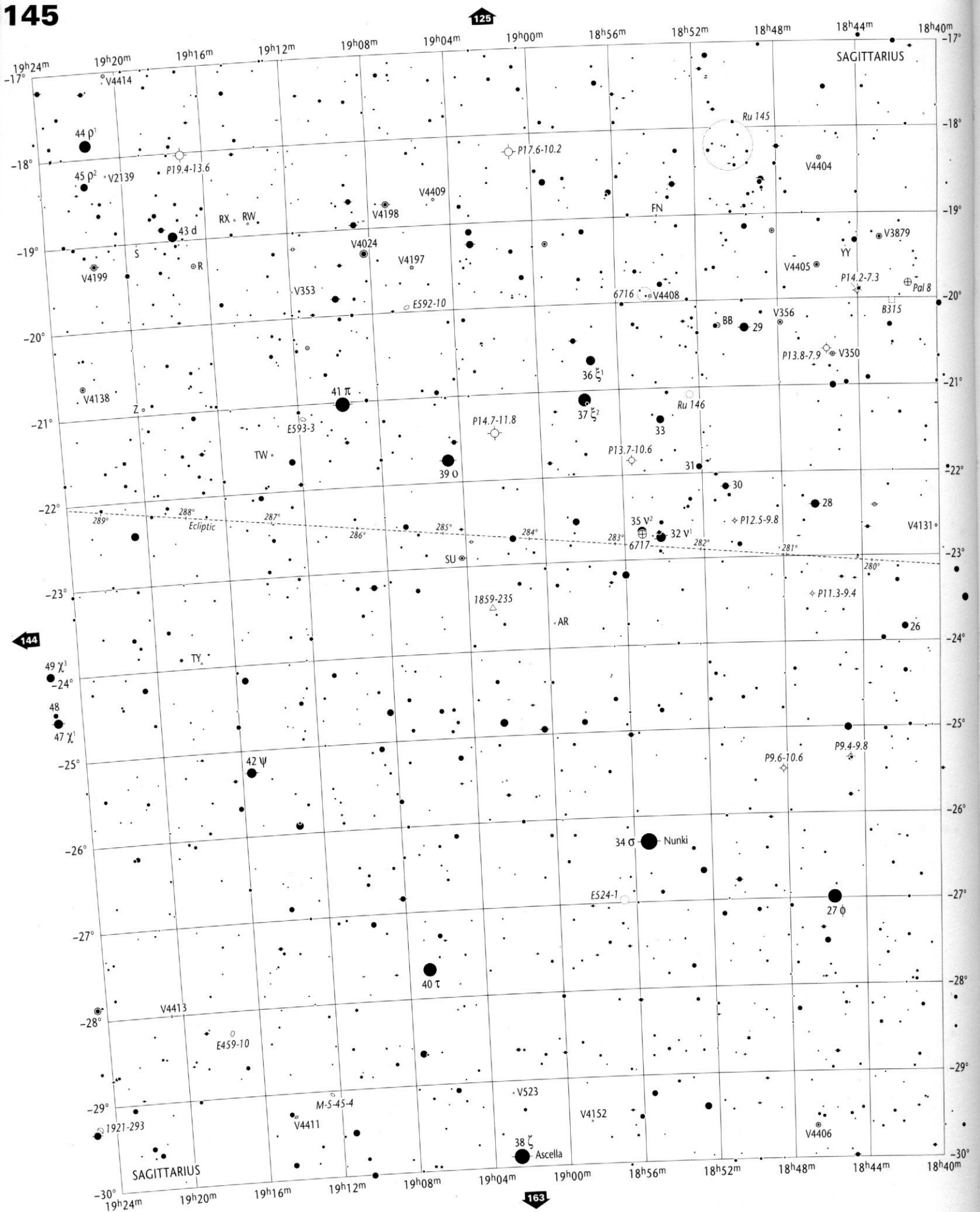


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	19^h16^m to 20^h44^m	SGR
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	$-17°$ to $-30°$	CAP, MIC

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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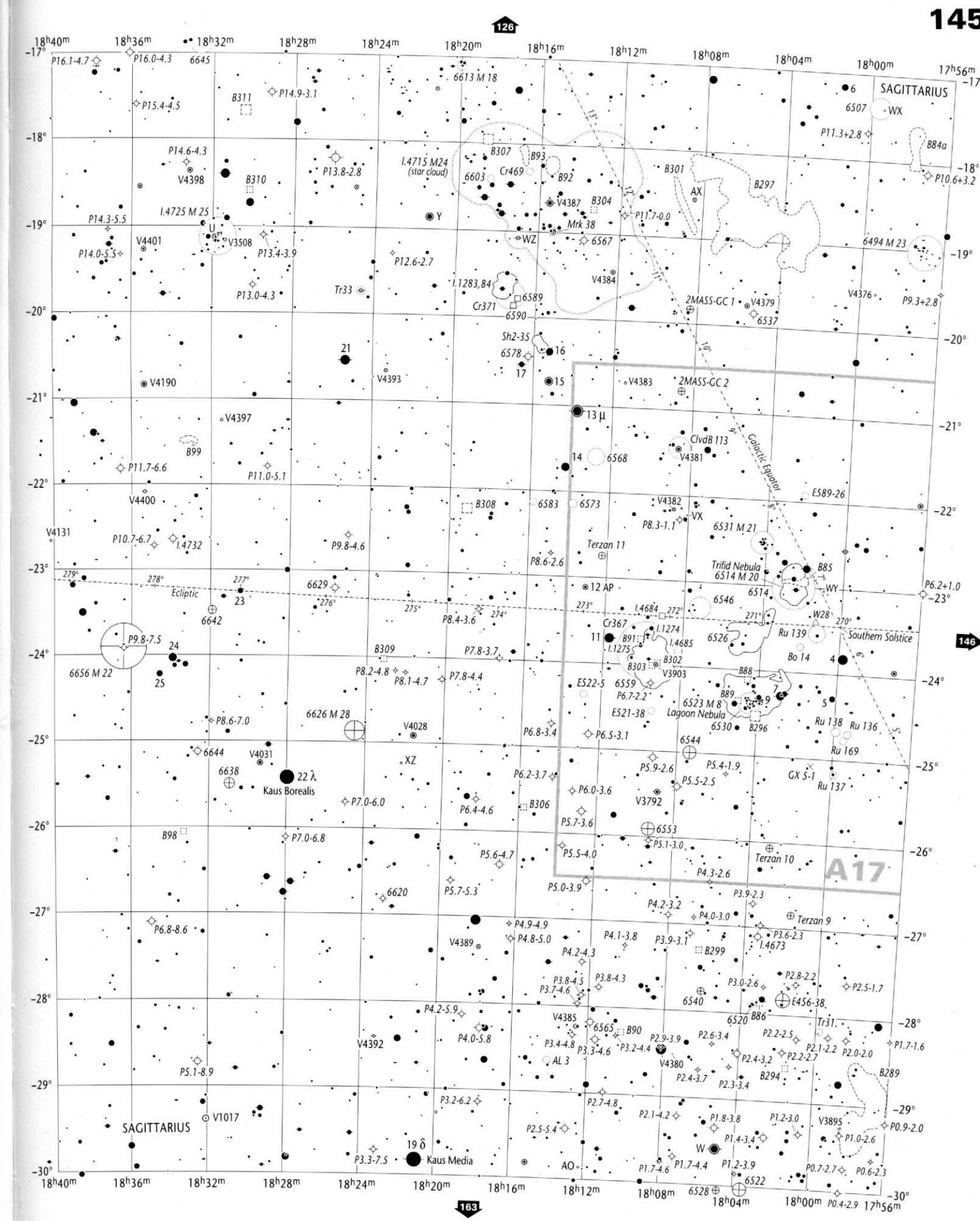
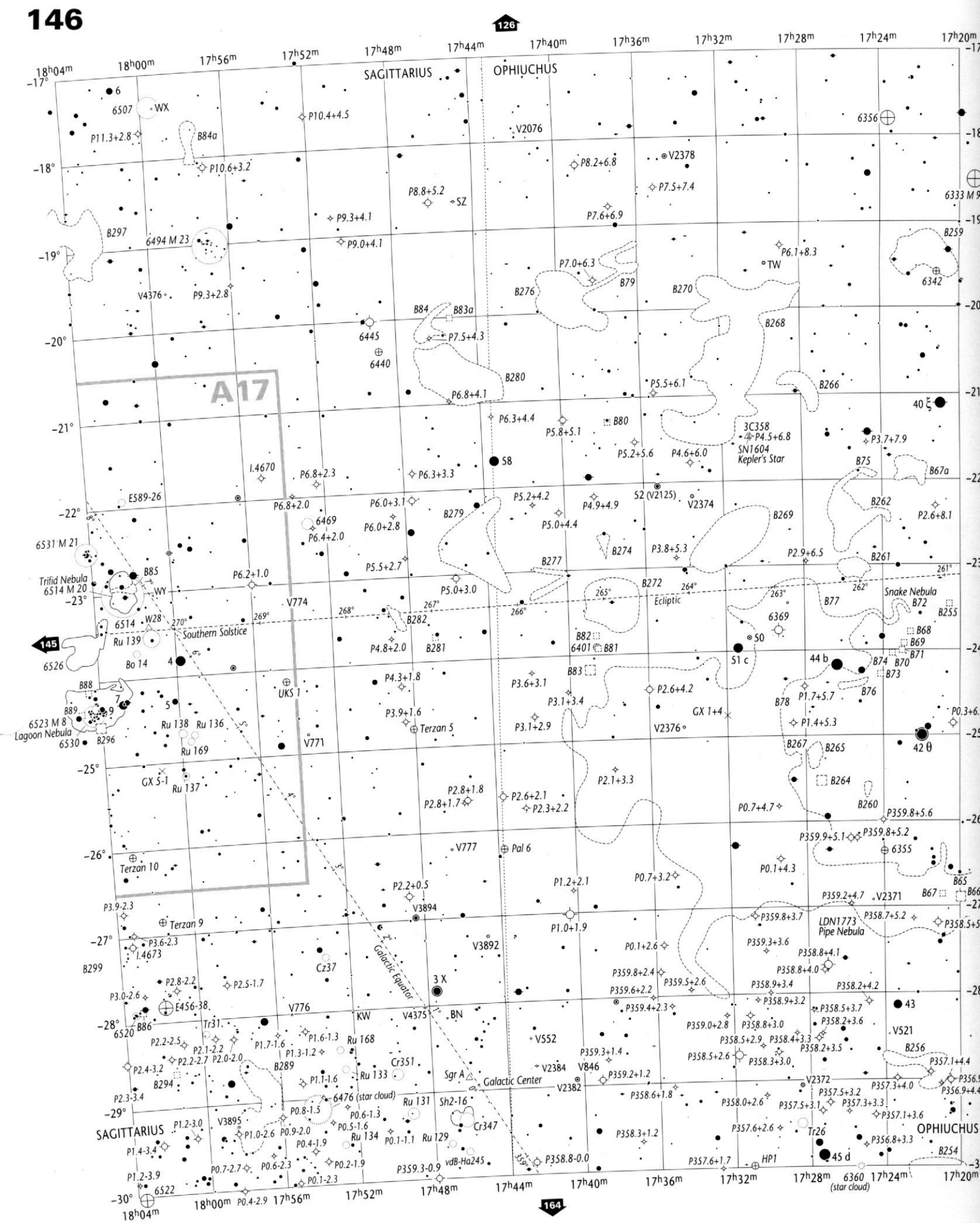


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	17^h56^m to 19^h24^m $-17°$ to $-30°$	SGR
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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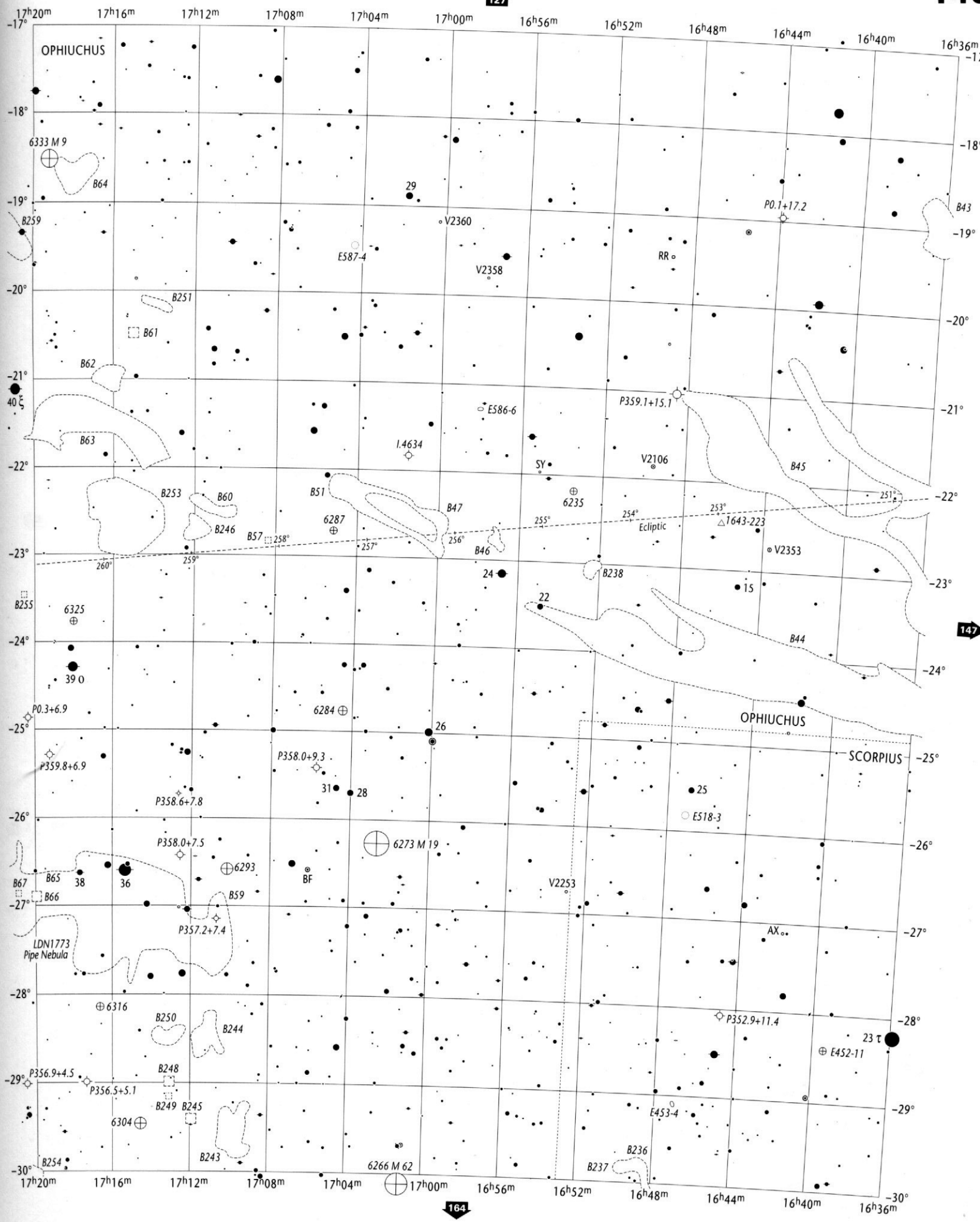
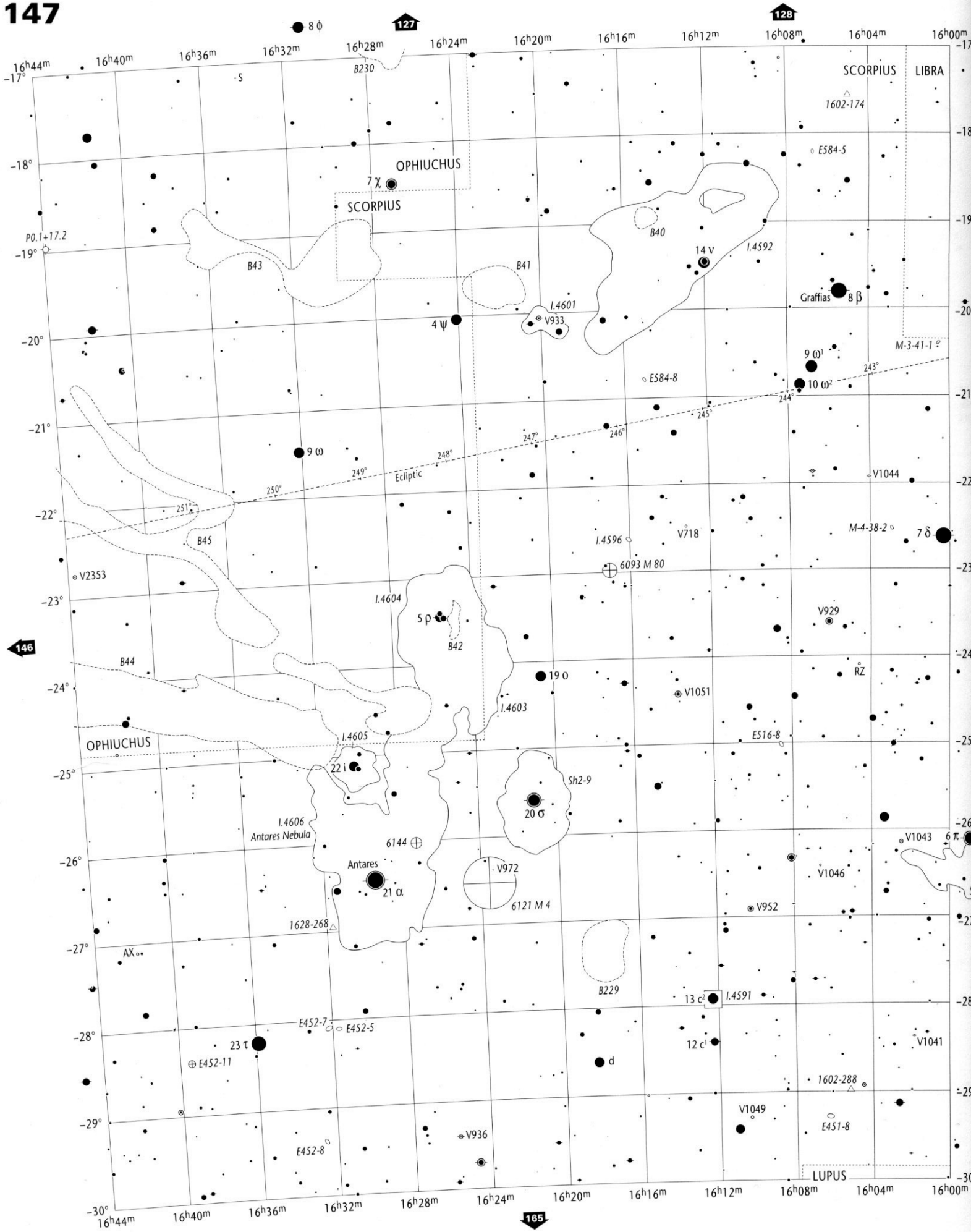


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' <5'	> 5' to scale; 5'-2' 2'-1' <1' major axis	to scale	**16h36m to 18h04m −17° to −30°**	**OPH** SGR, SCO

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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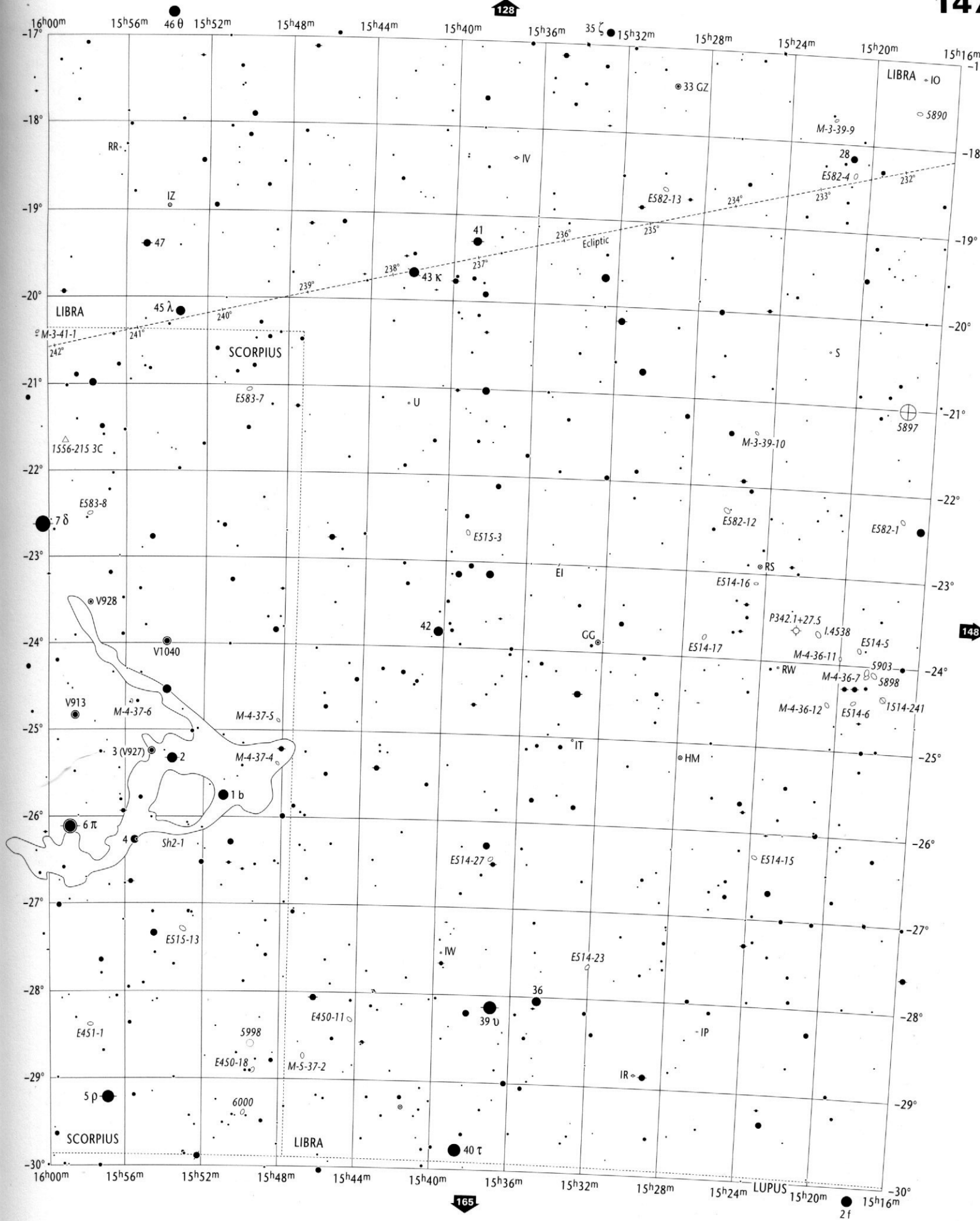

Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	**15h16m to 16h44m -17° to -30°**	**SCO** LIB, OPH, LUP

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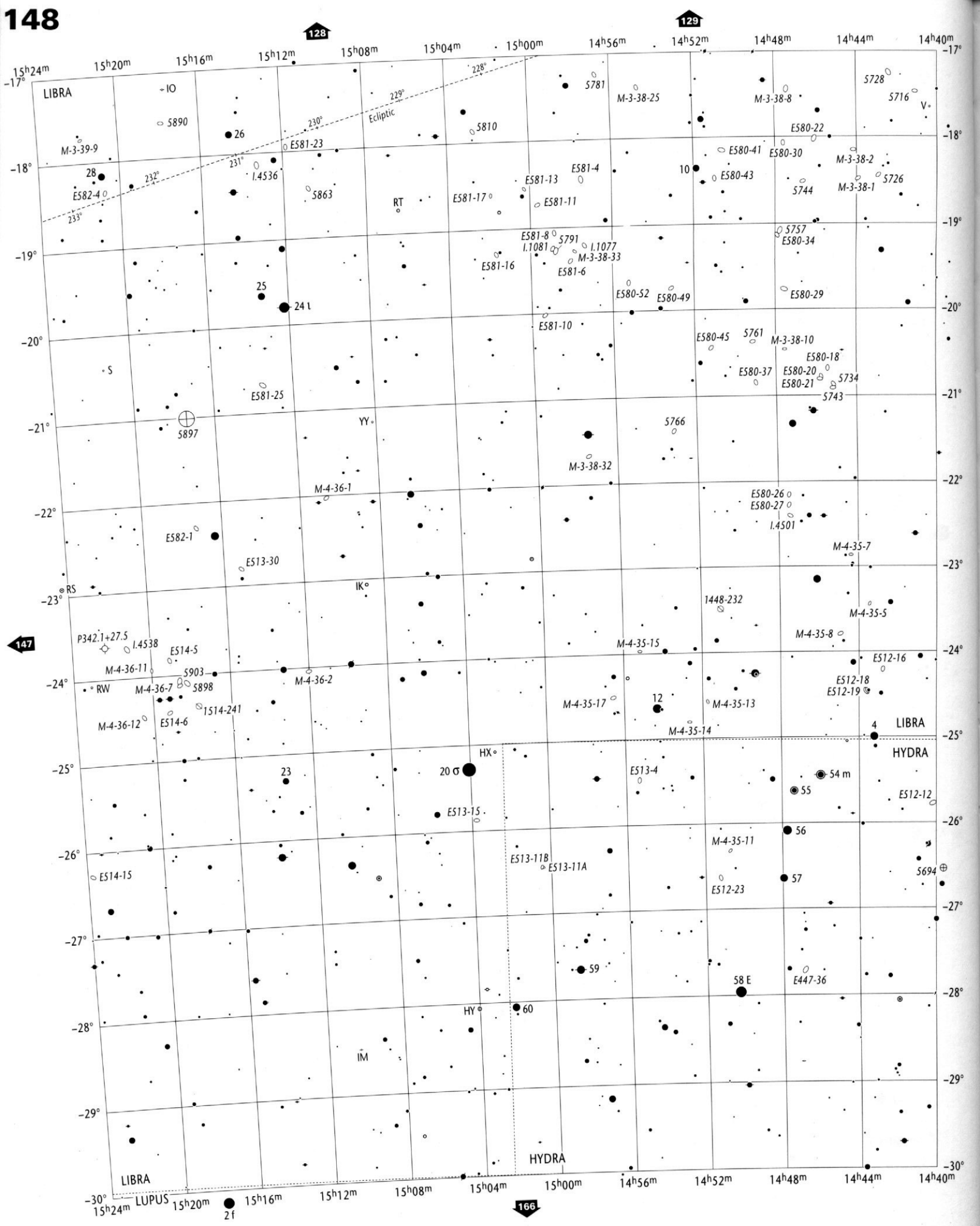

Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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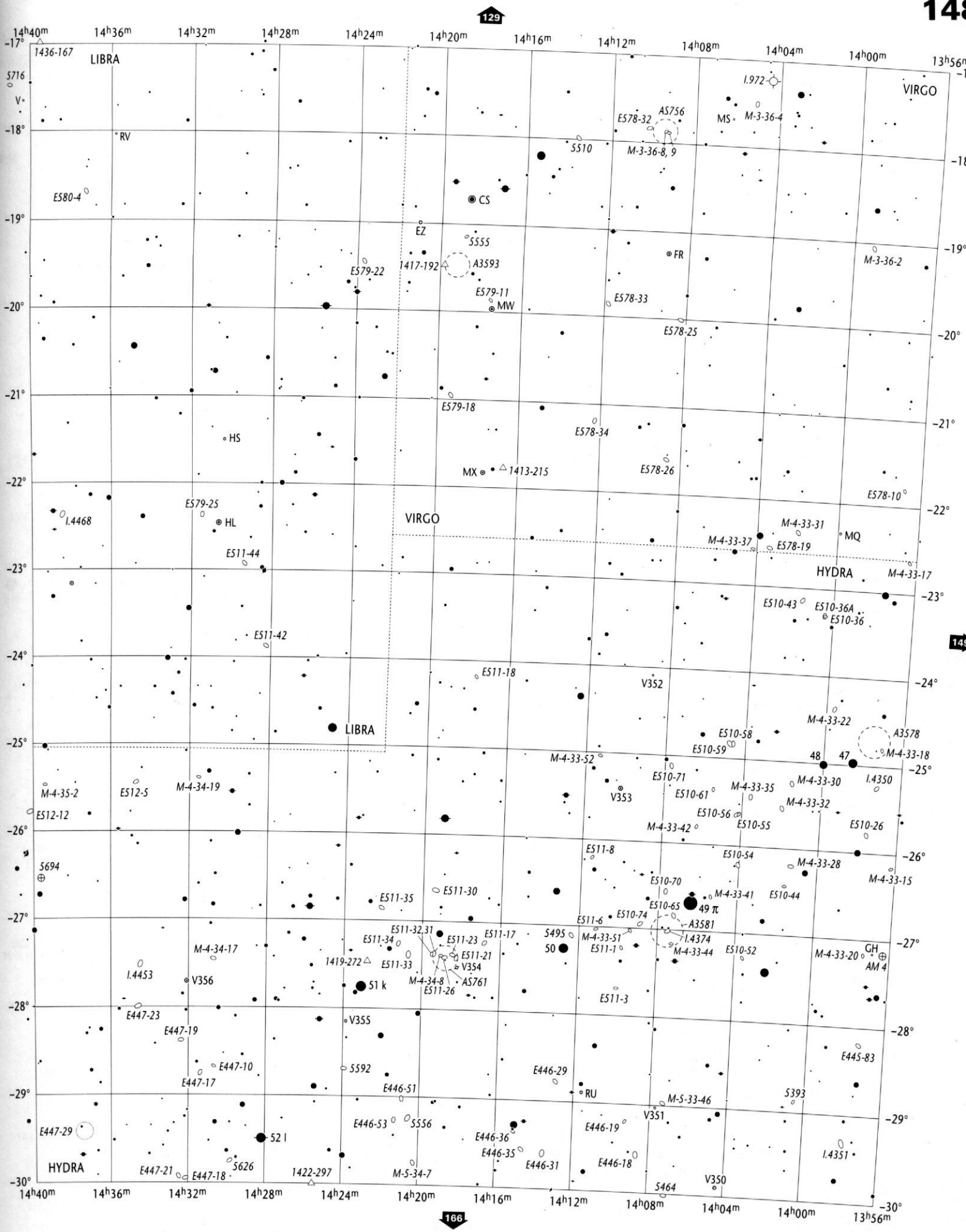
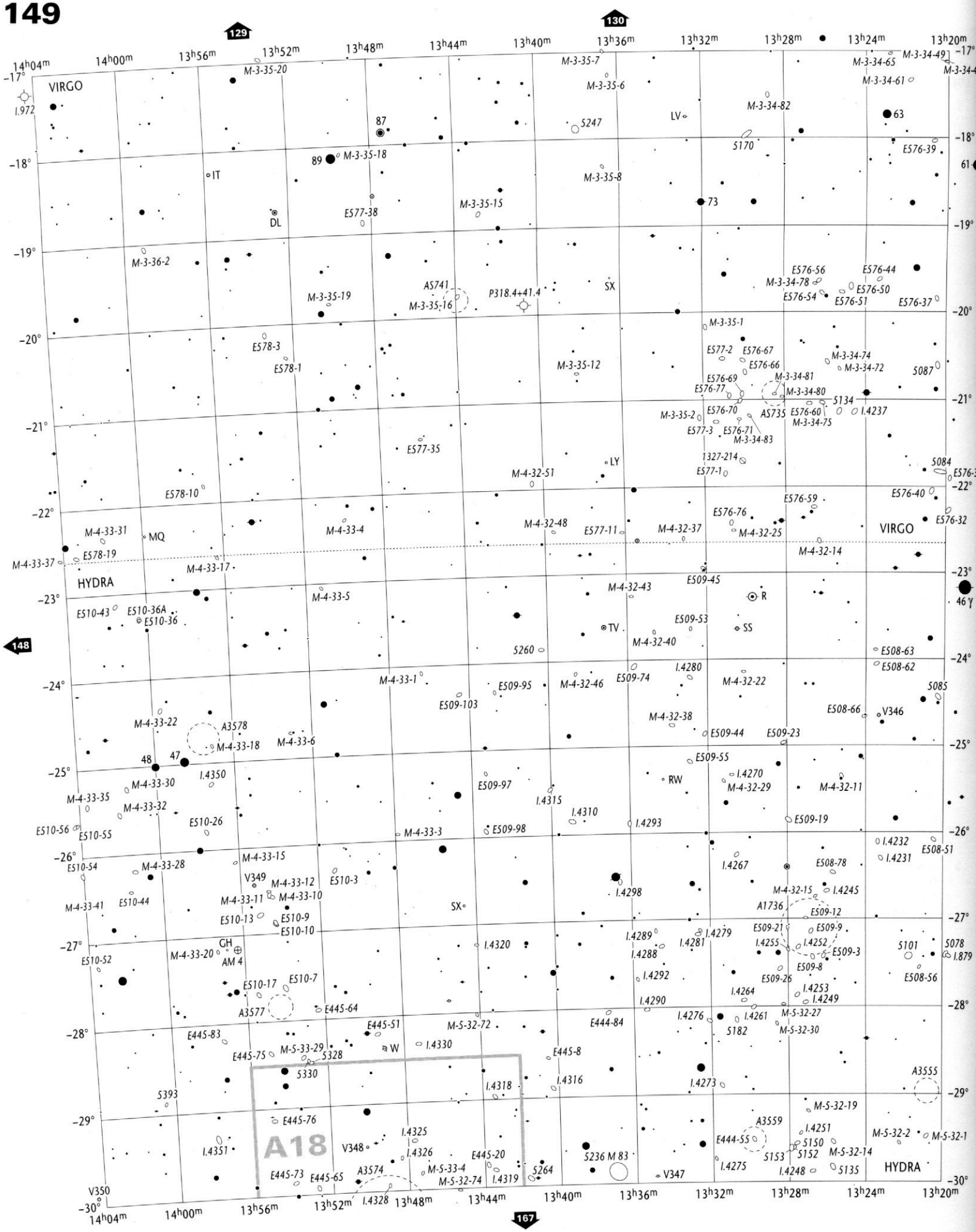


Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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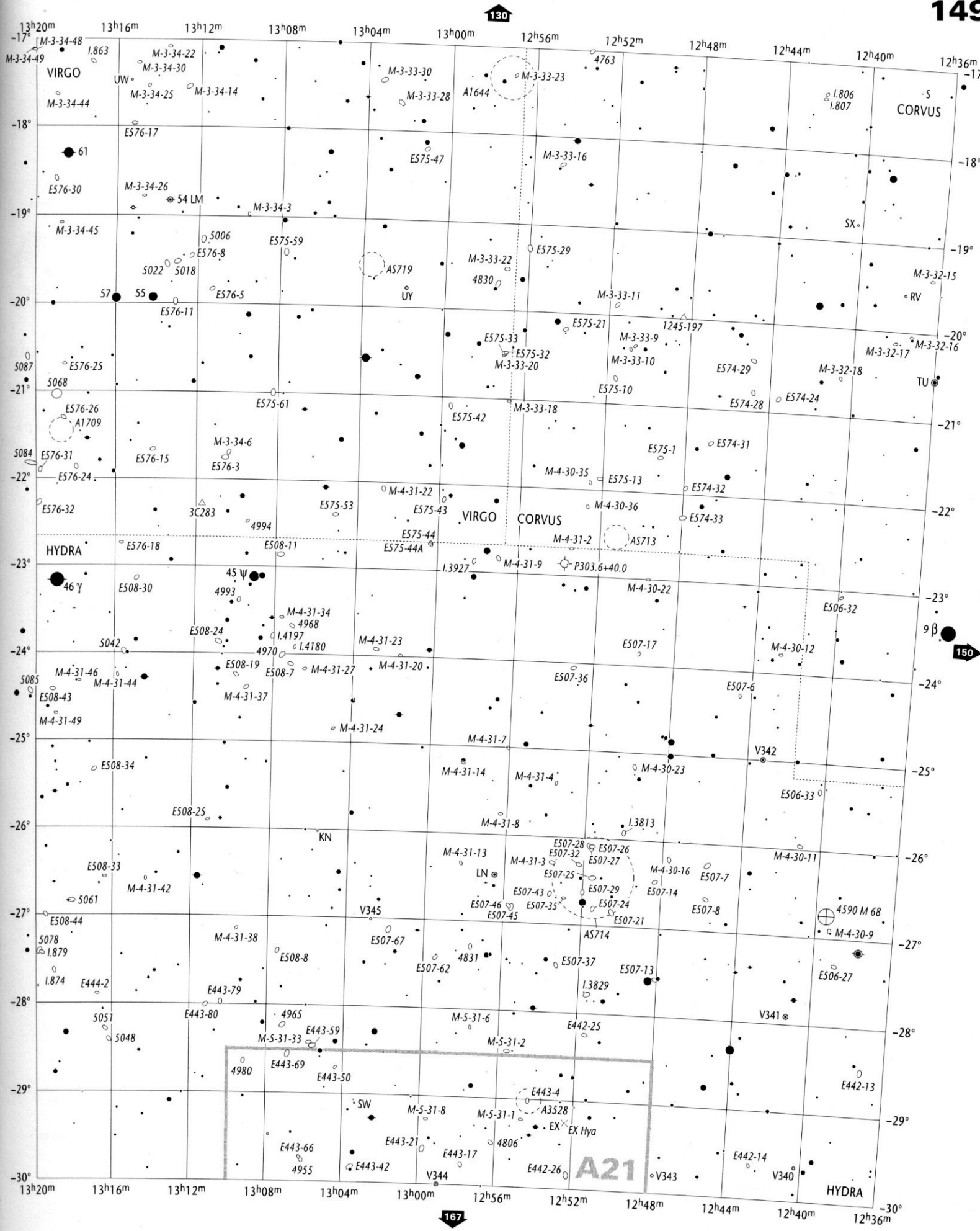
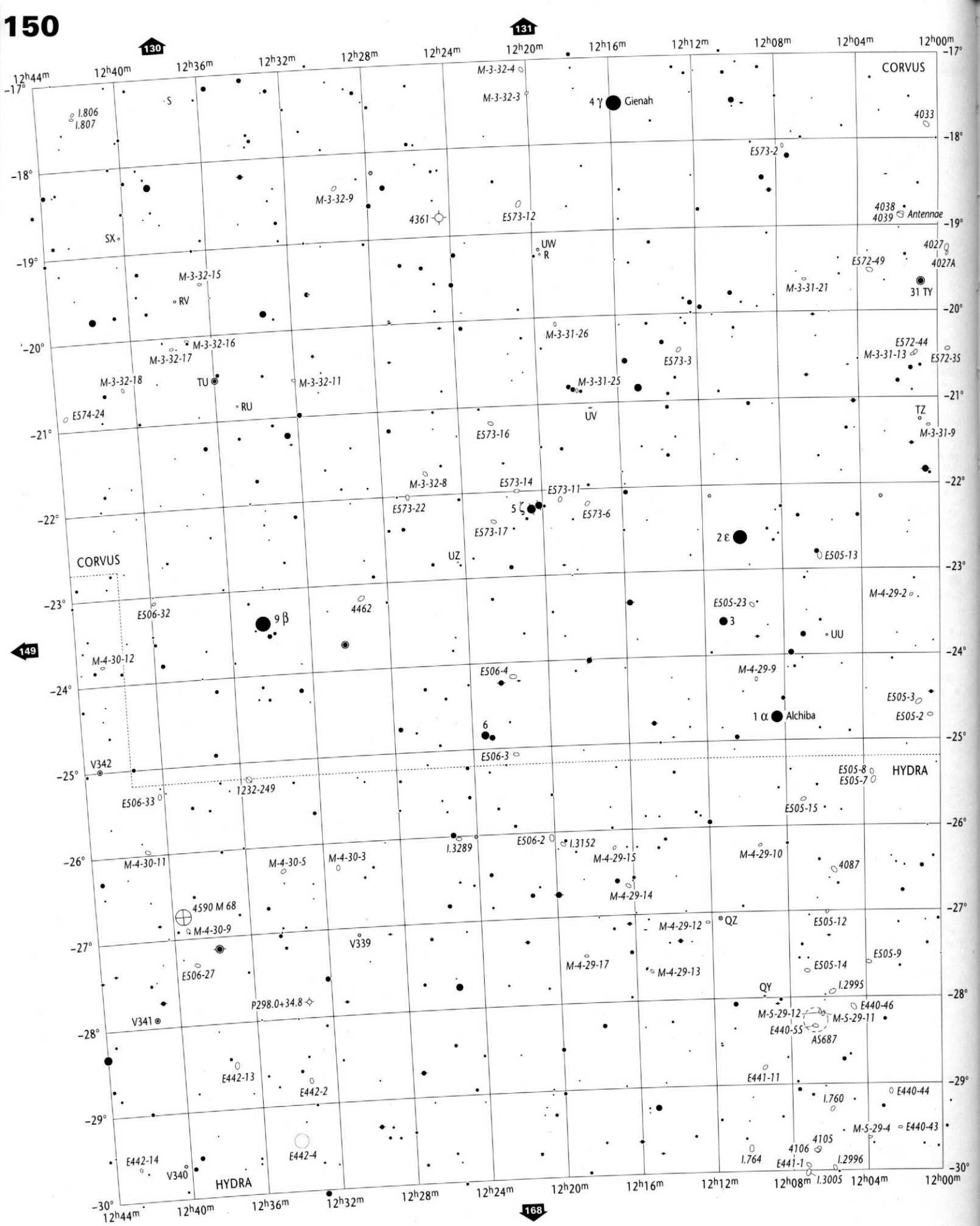


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	12h36m to 14h04m -17° to -30°	HYA VIR, CRV
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Willi Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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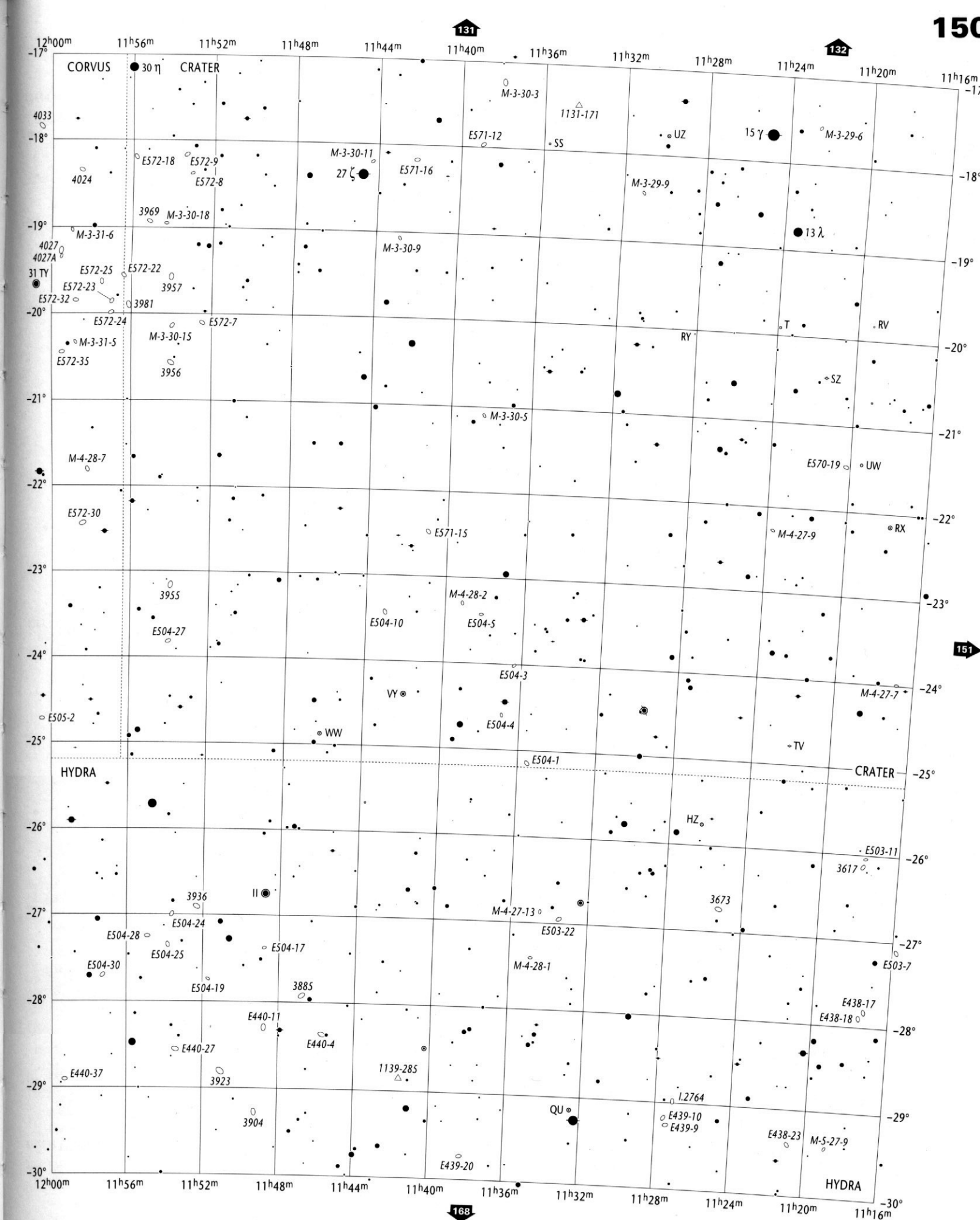
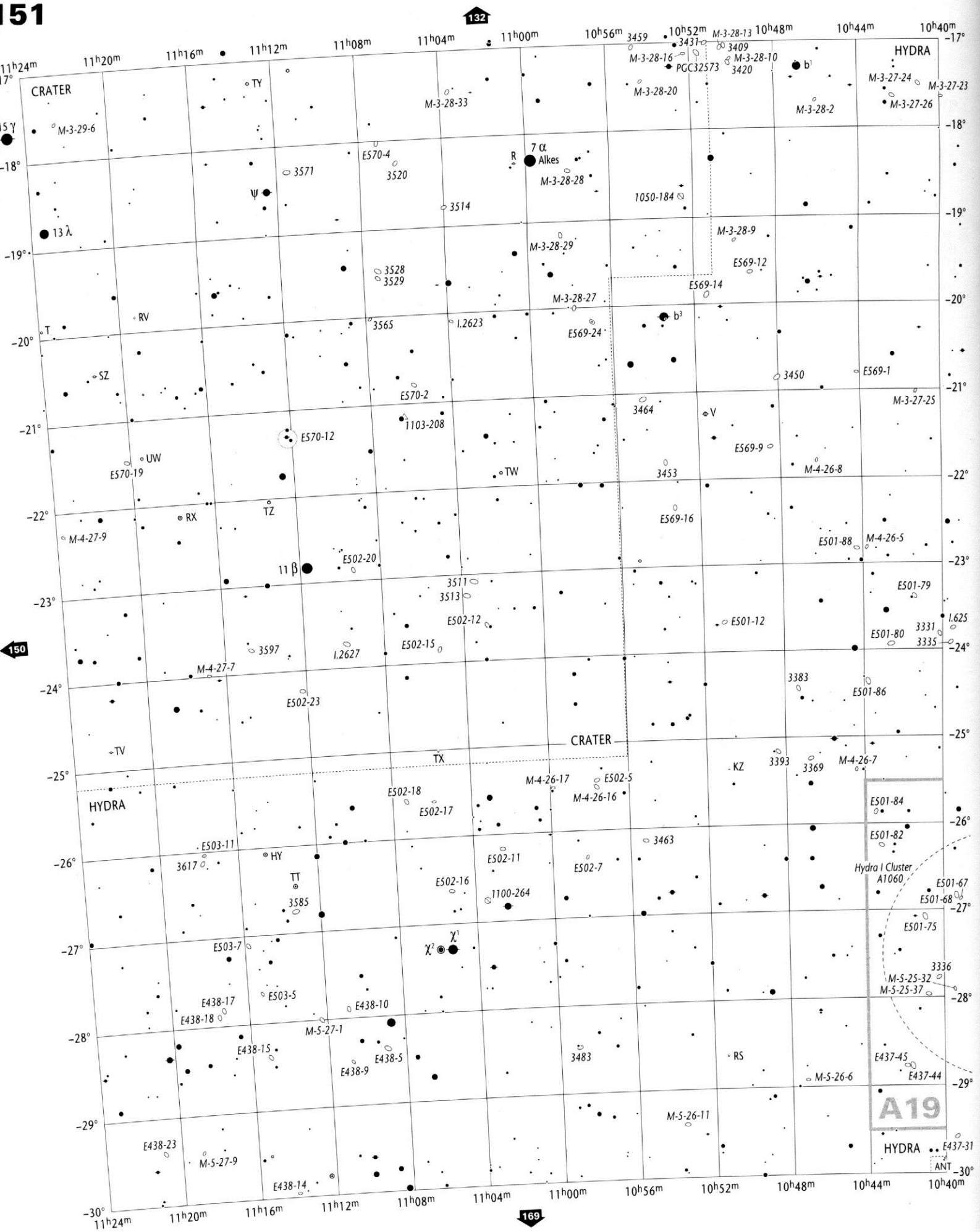


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

11h16m to 12h44m
-17° to -30°

HYA
CRV, CRT

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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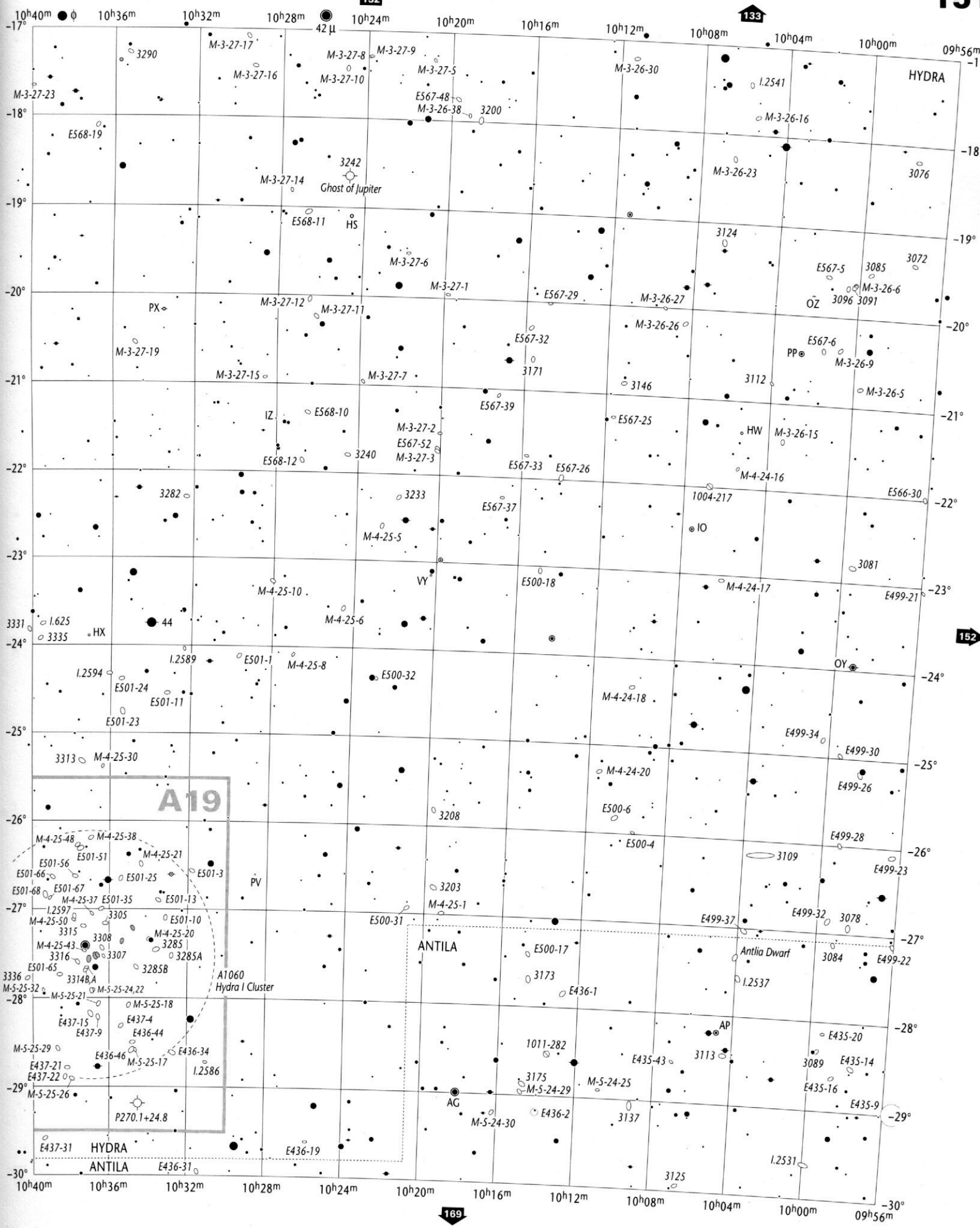

Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	**09h56m to 11h24m** **-17° to -30°**	**HYA** CRT, ANT

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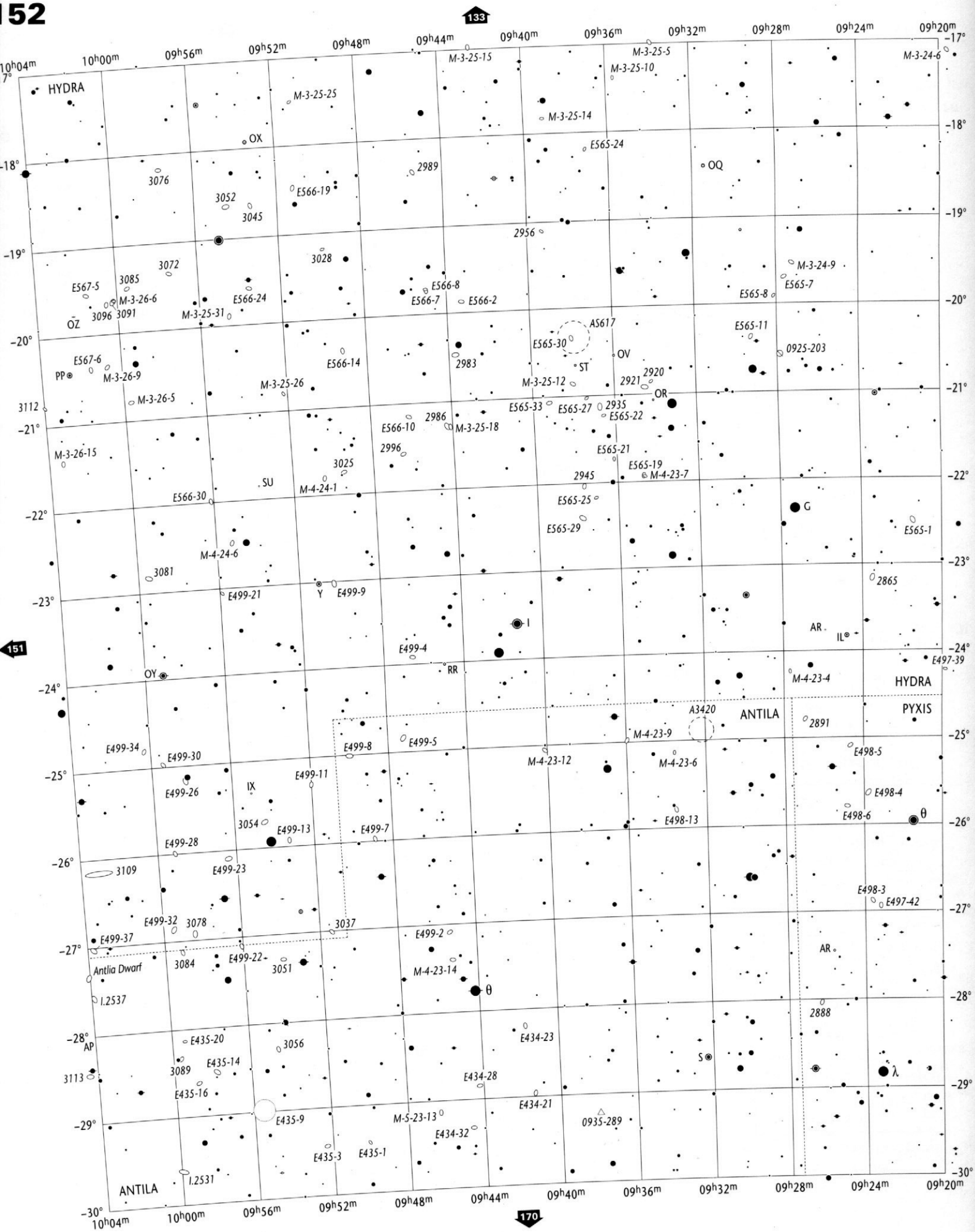

Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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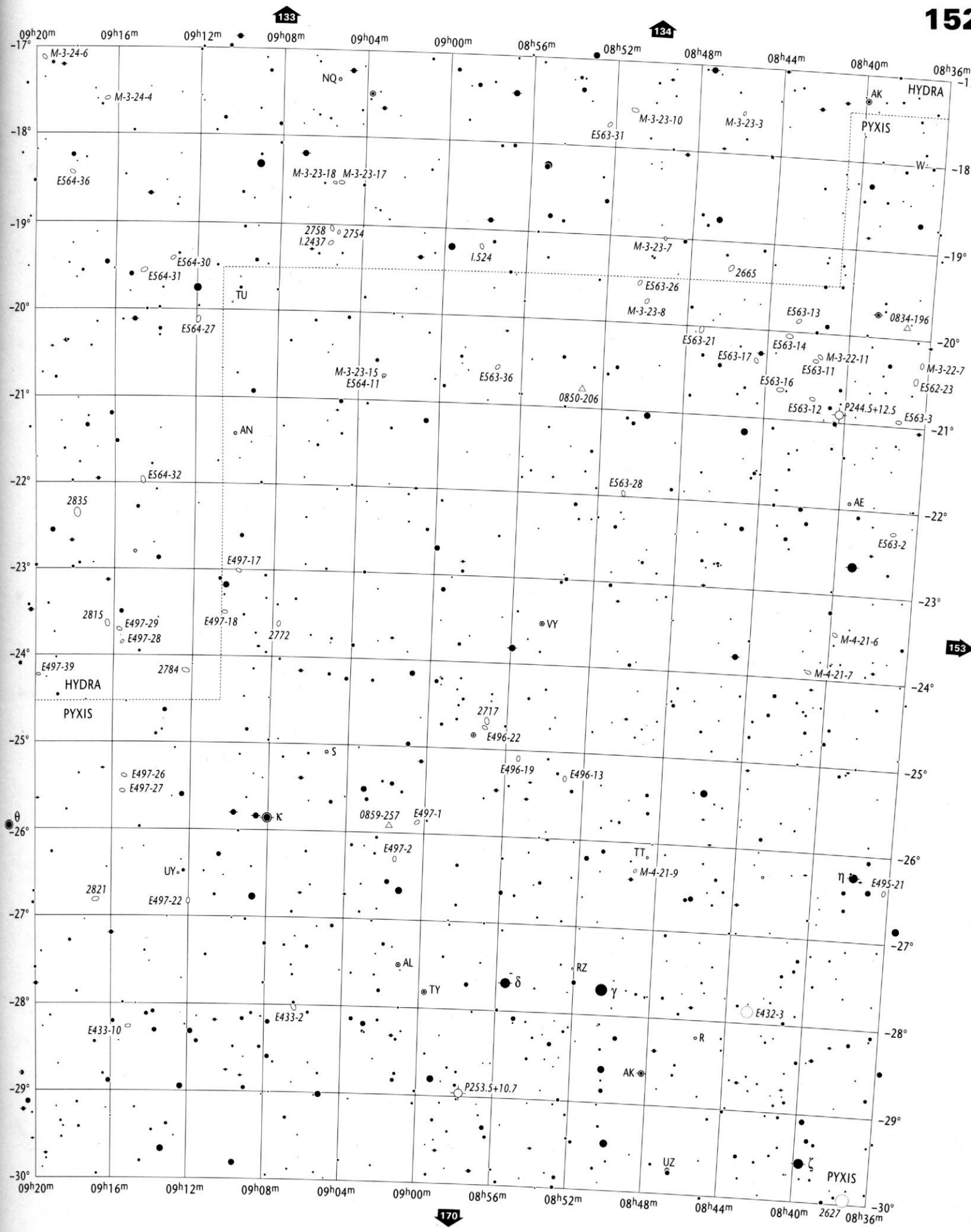
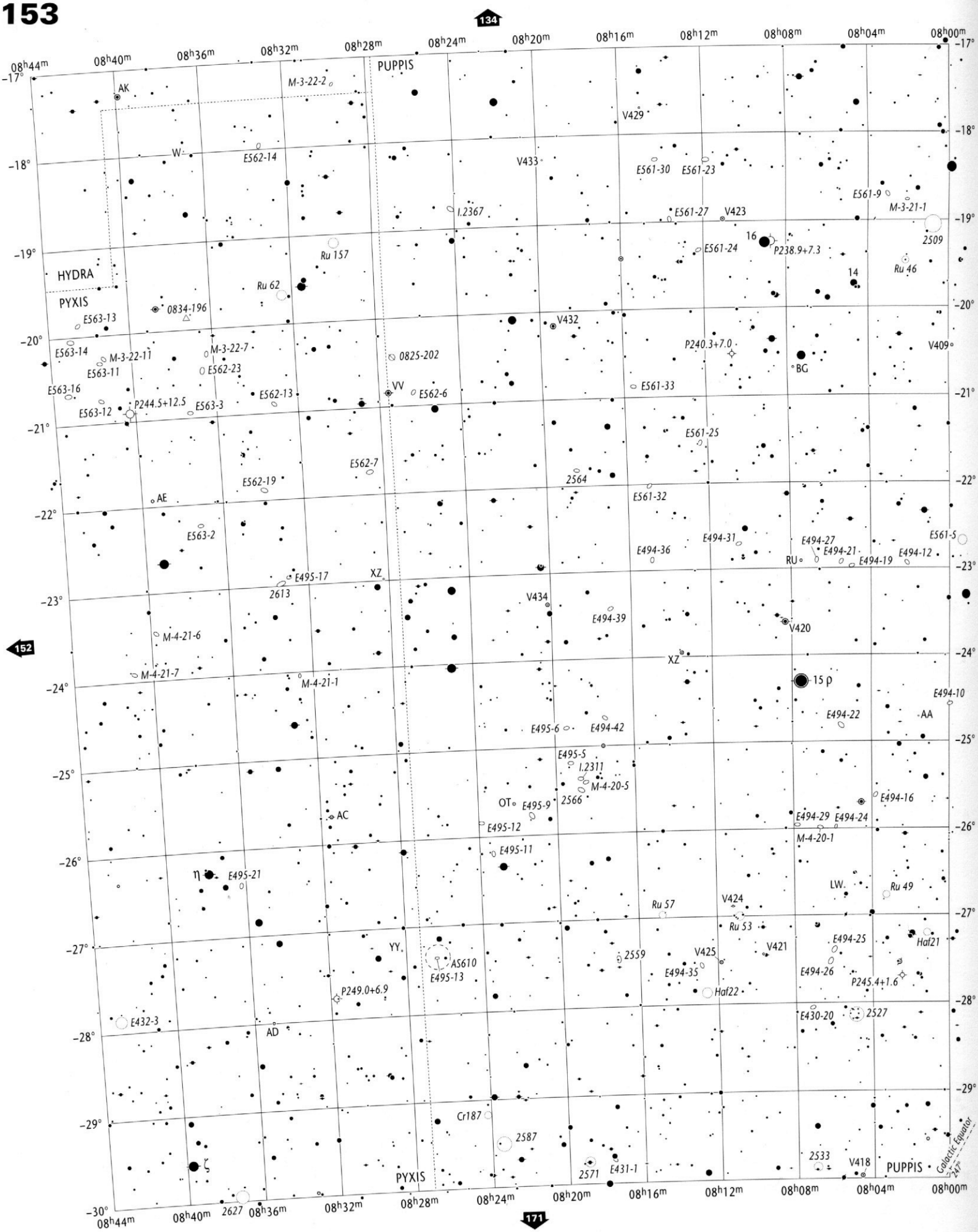


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

08h36m to 10h04m
-17° to -30°

HYA
PYX, ANT

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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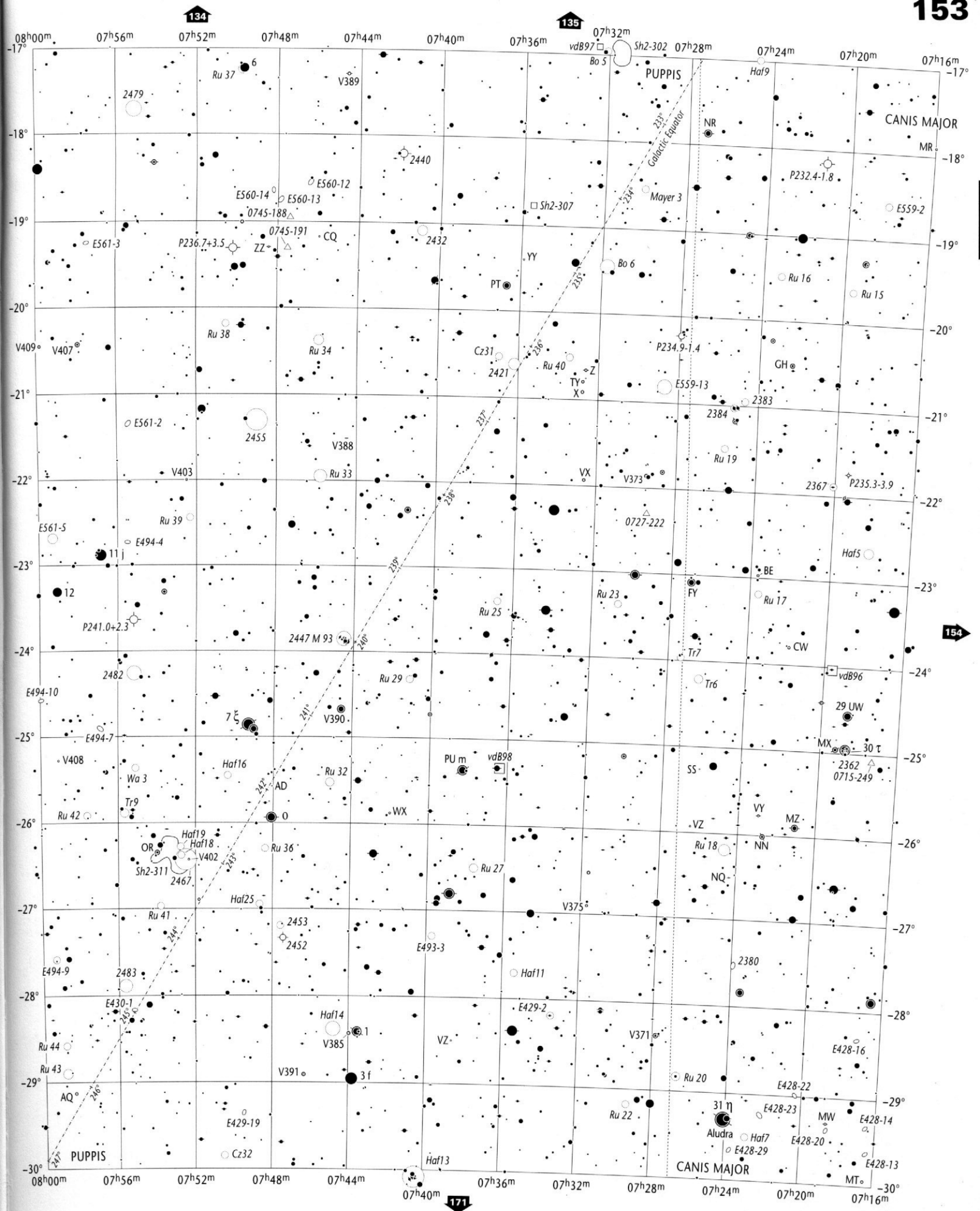
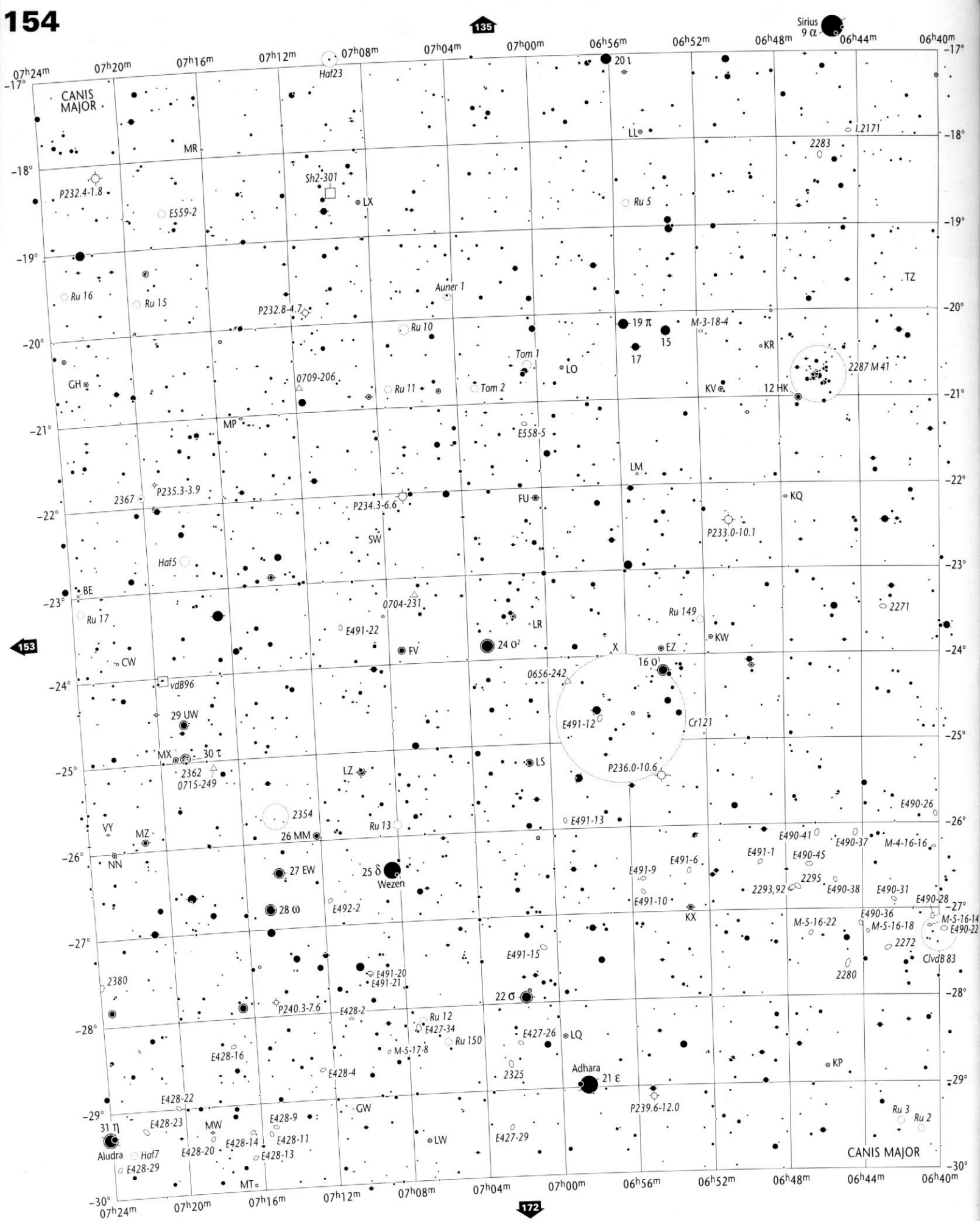


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale · < 5'	to scale · < 5'	>30" · 30"-10" · 10"-5" · < 5"	to scale · 10' - 5' · < 5'	> 5' to scale · 5'-2' · 2'-1' · < 1' major axis	to scale

07h16m to 08h44m
-17° to -30°

PUP
PYX, CMA, HYA

Wil Tirion / Barry Rappaport / Will Remaklus



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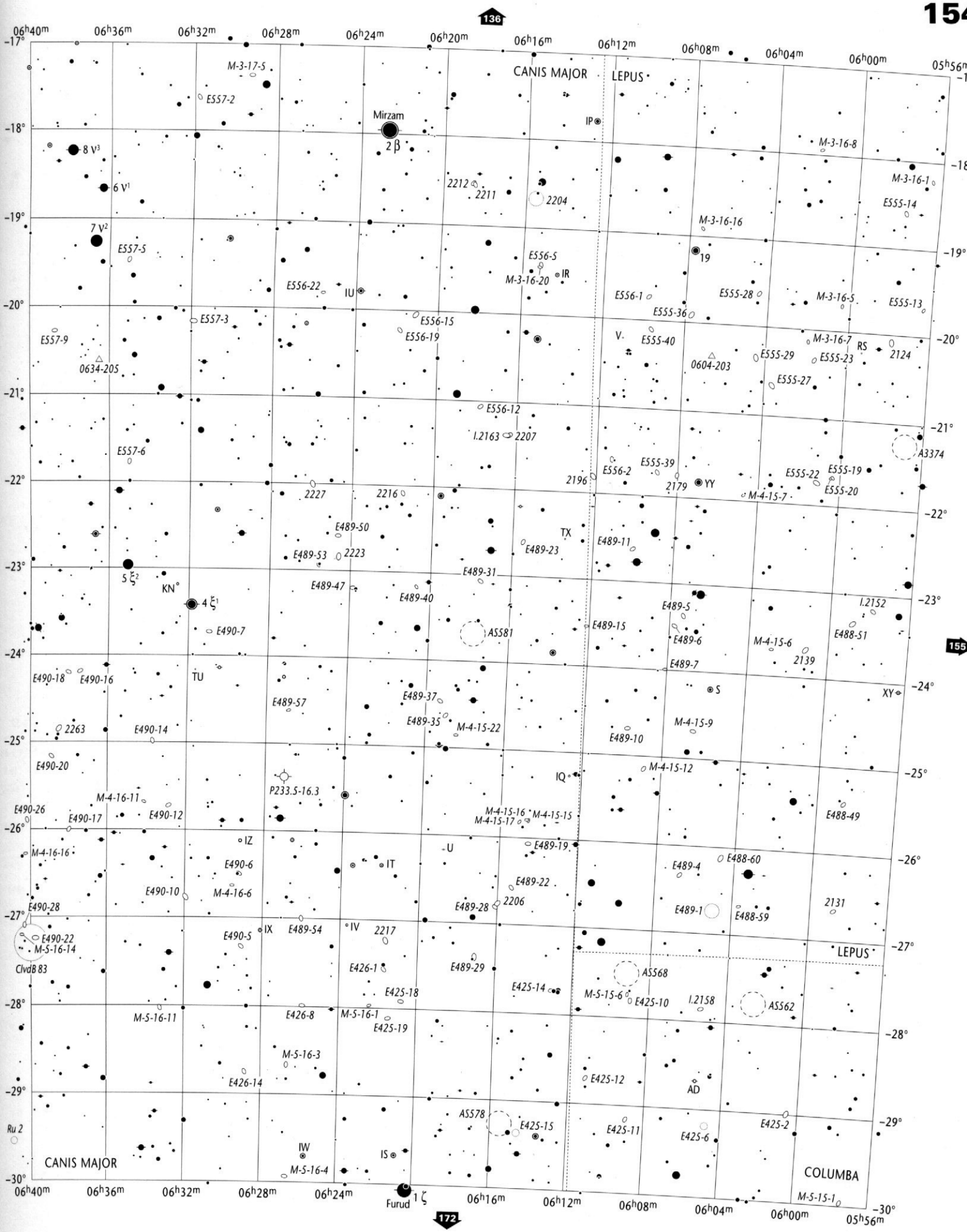
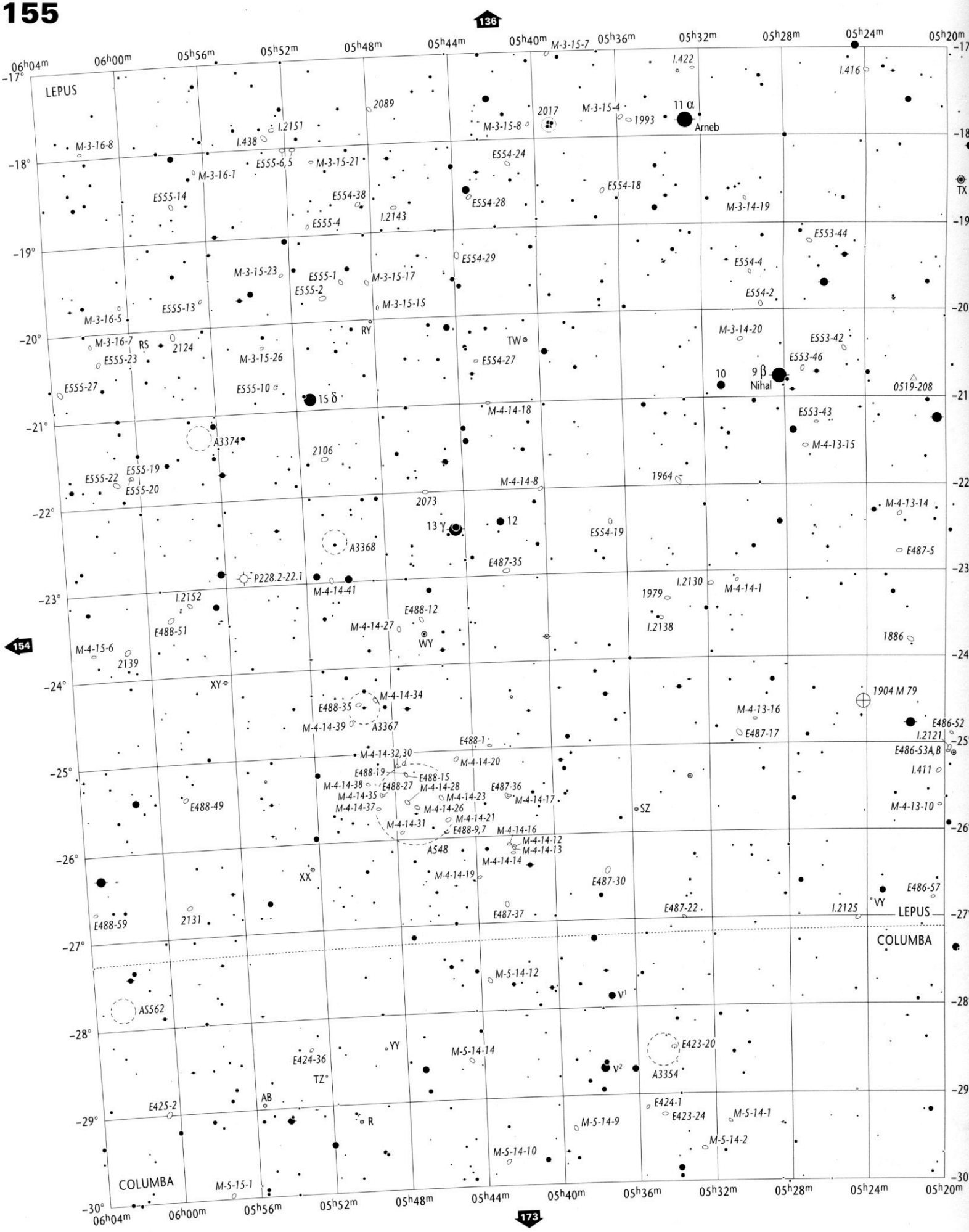


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	05h56m to 07h24m	CMA
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	−17° to −30°	LEP, COL

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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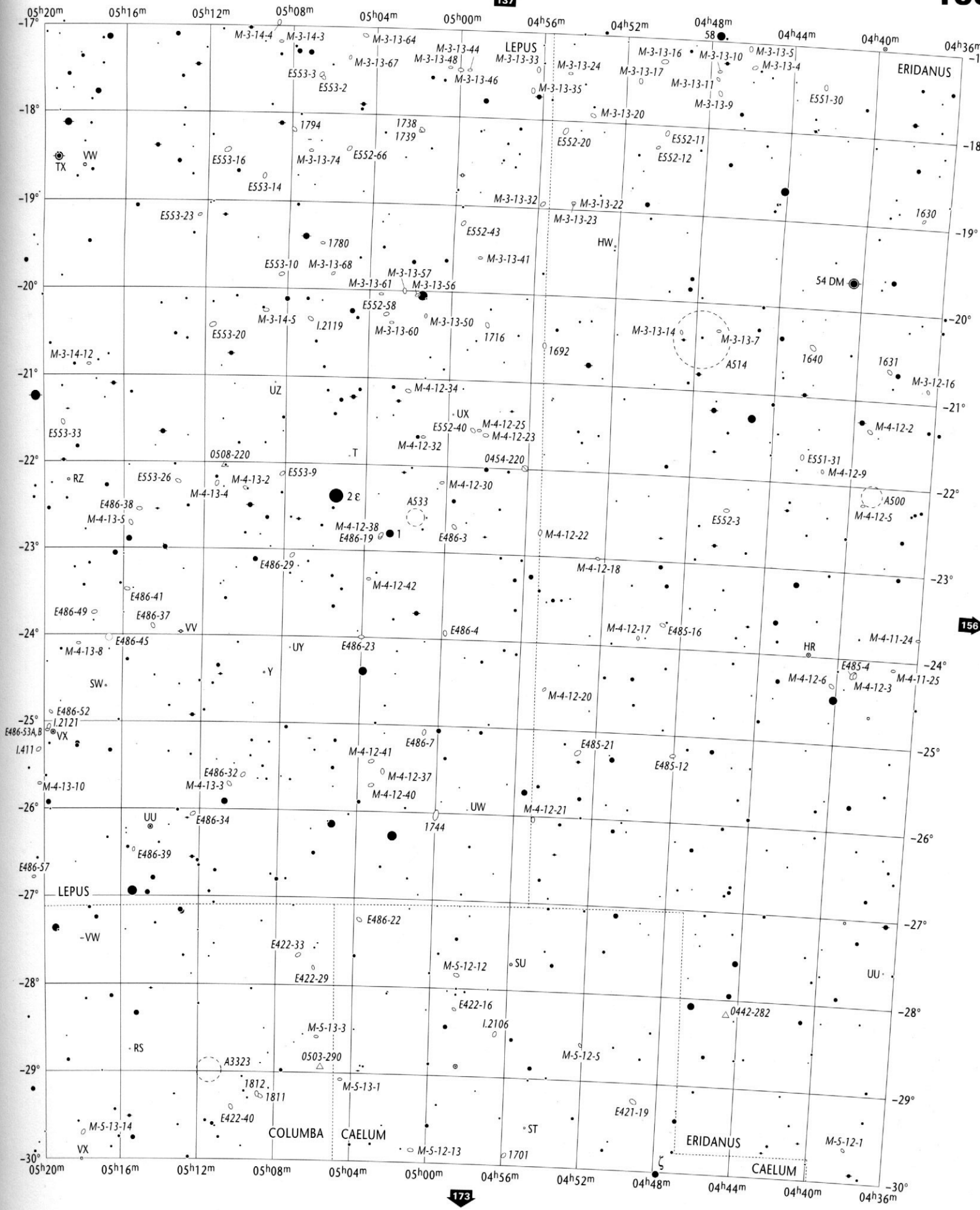
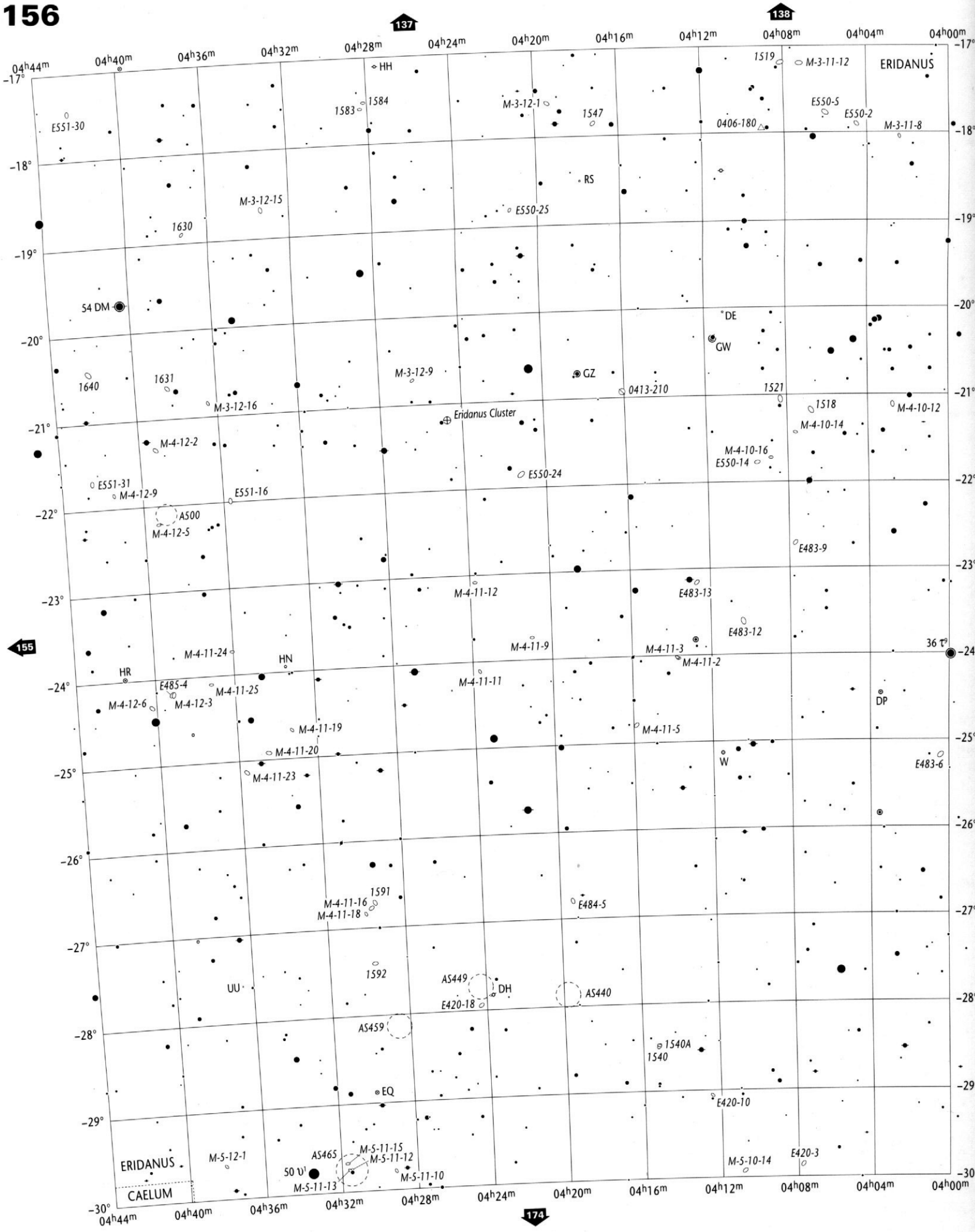


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	04h36m to 06h04m −17° to −30°	LEP ERI, COL, CAE
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

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Quasar
Radio Source
X-Ray Source

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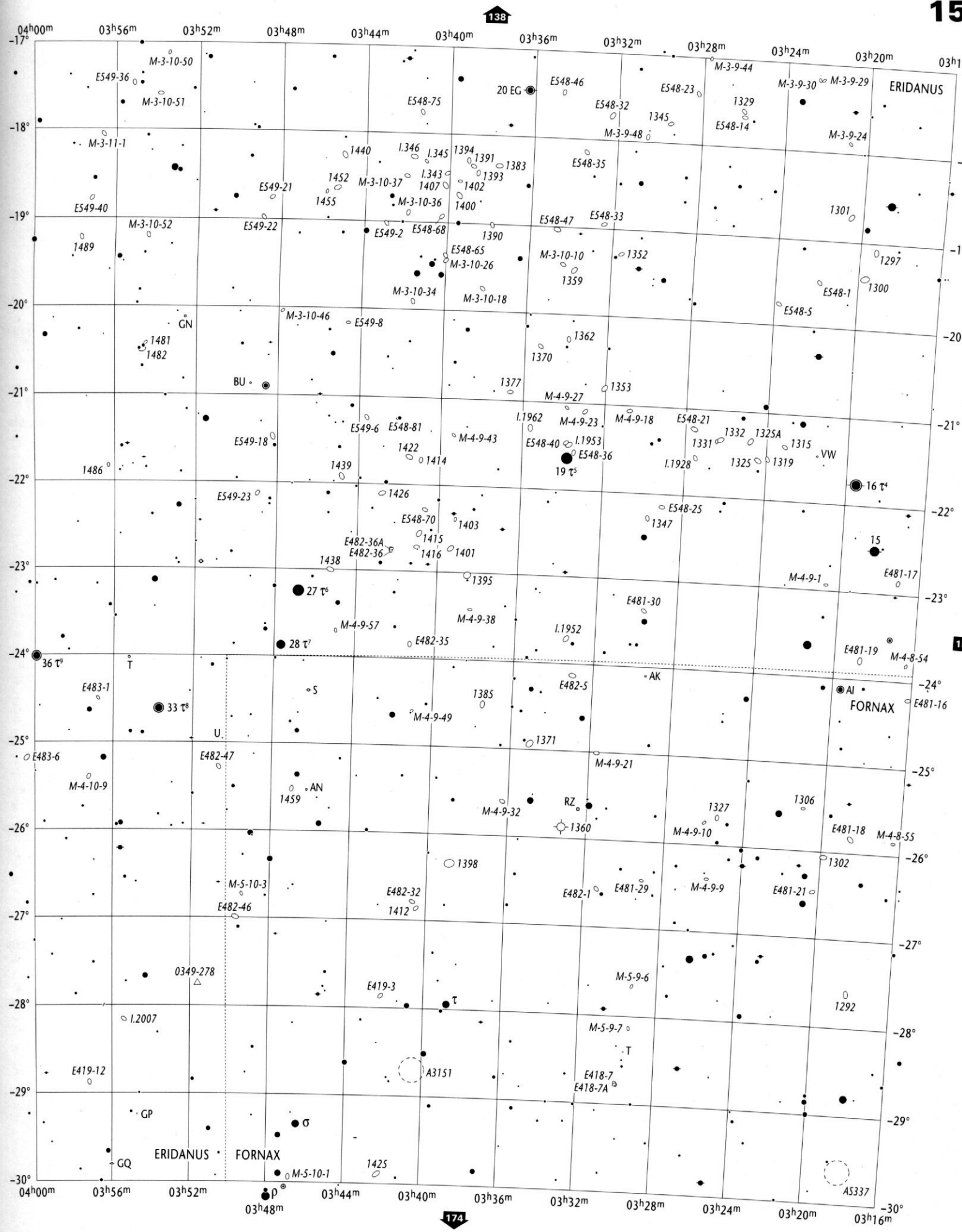
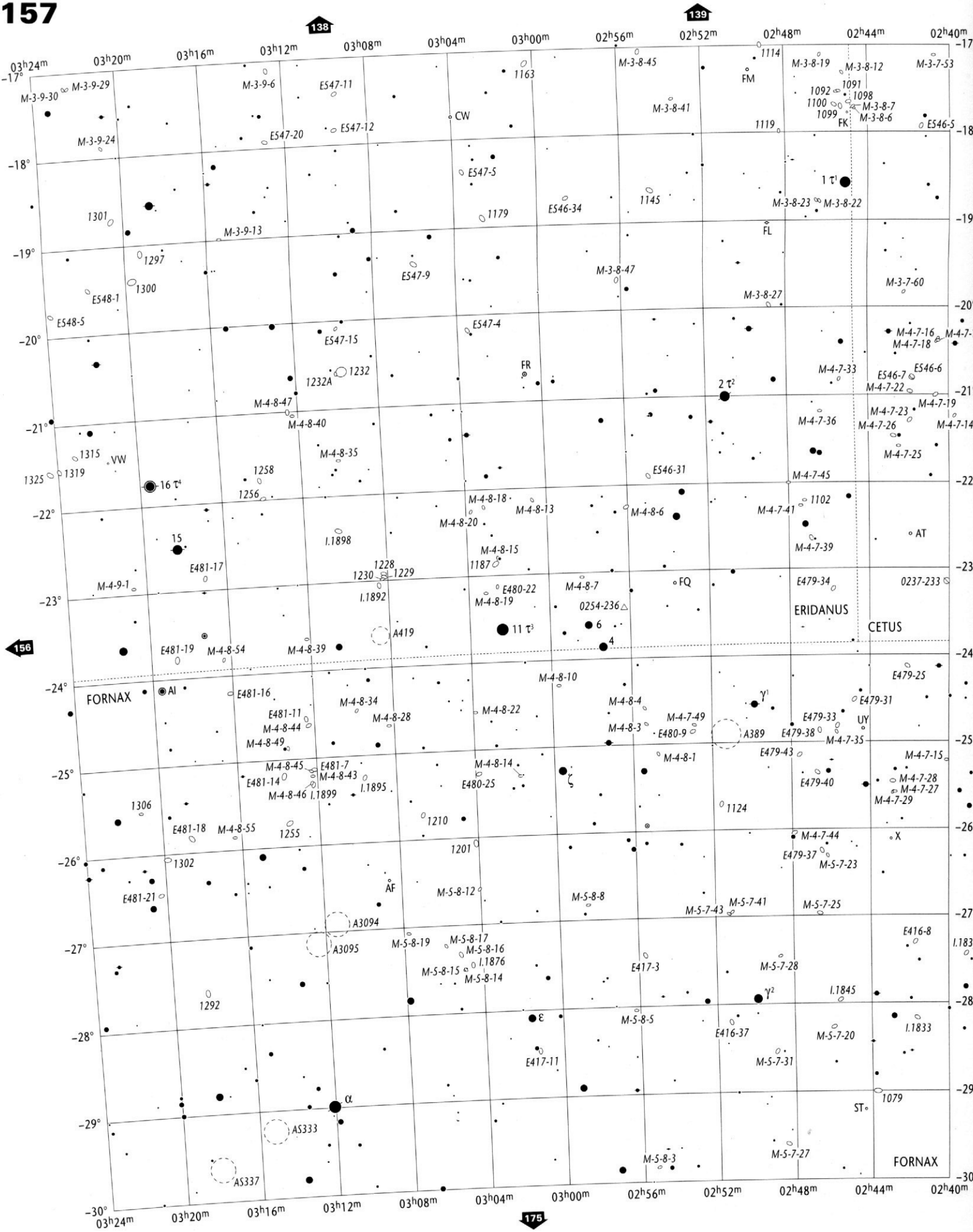


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

03h16m to 04h44m
−17° to −30°

ERI
FOR, CAE

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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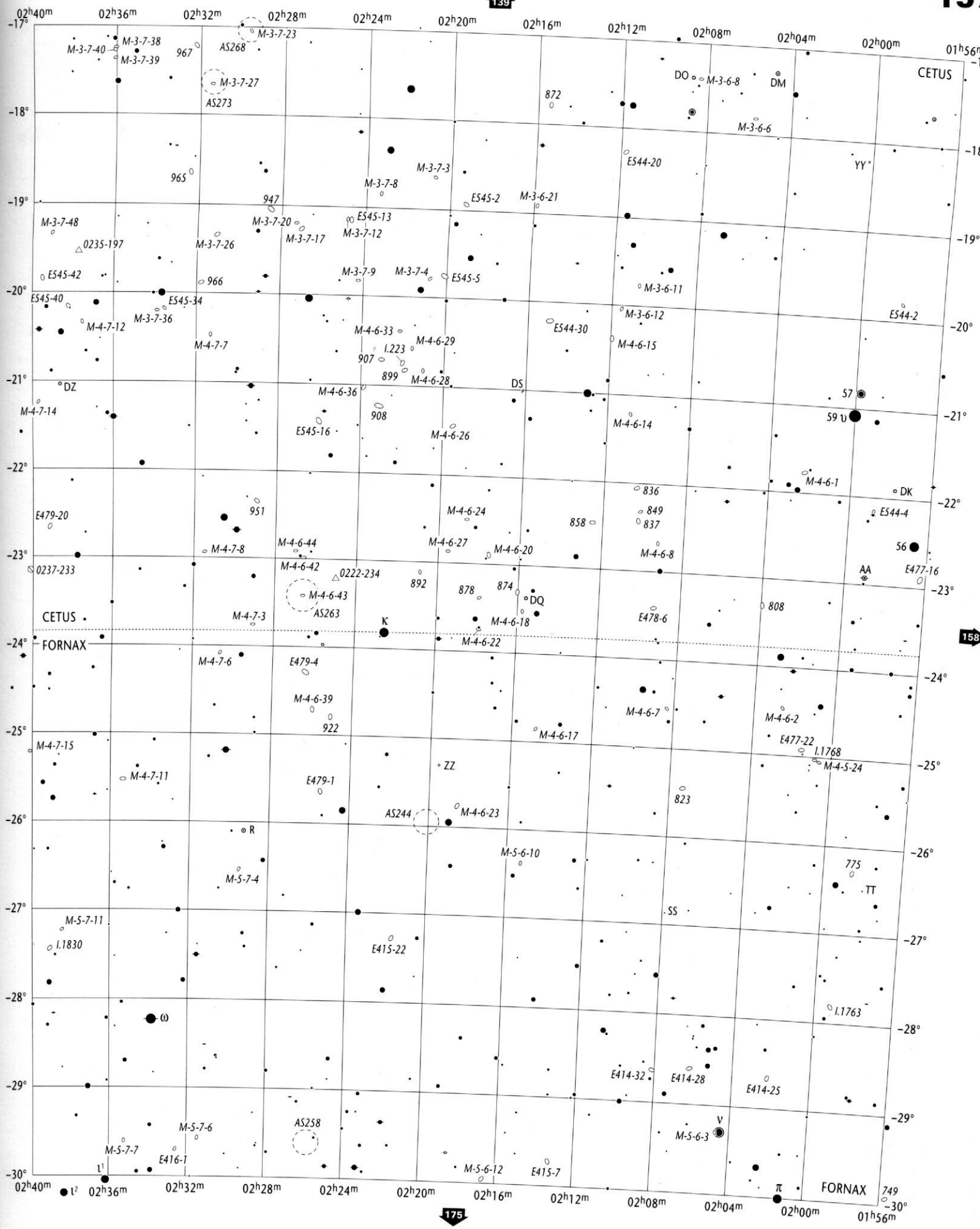
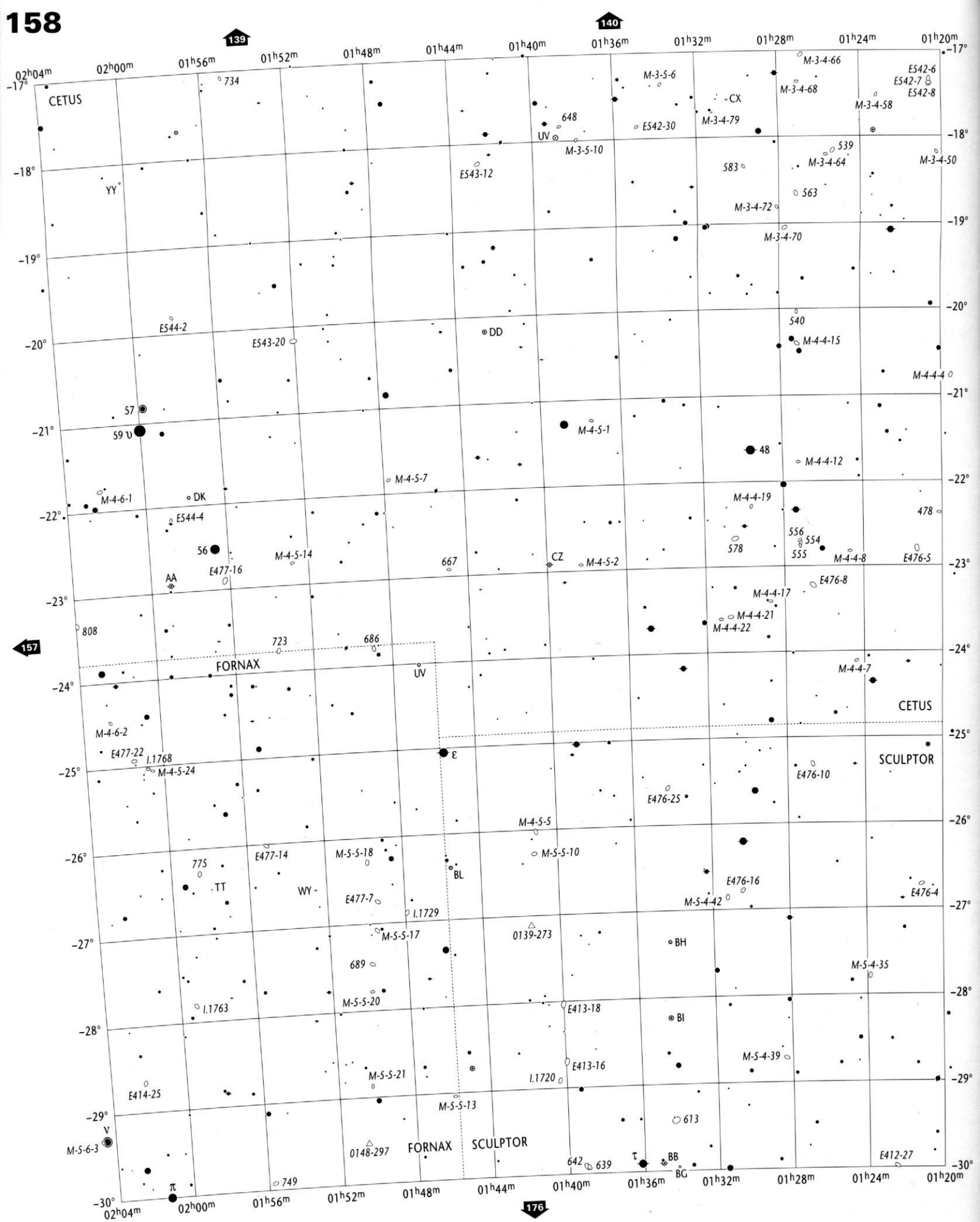


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

01h56m to 03h24m
-17° to -30°

FOR CET, ERI

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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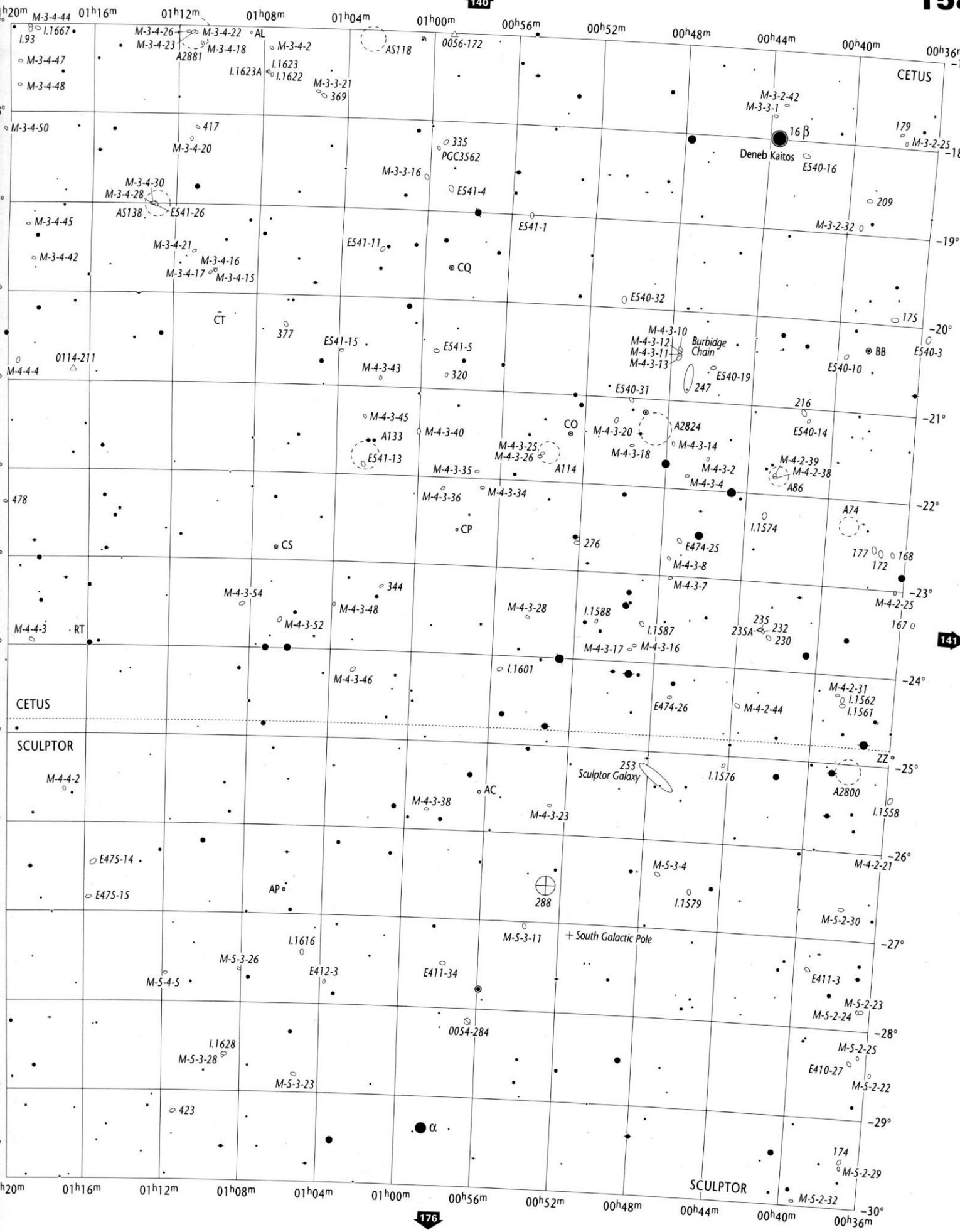
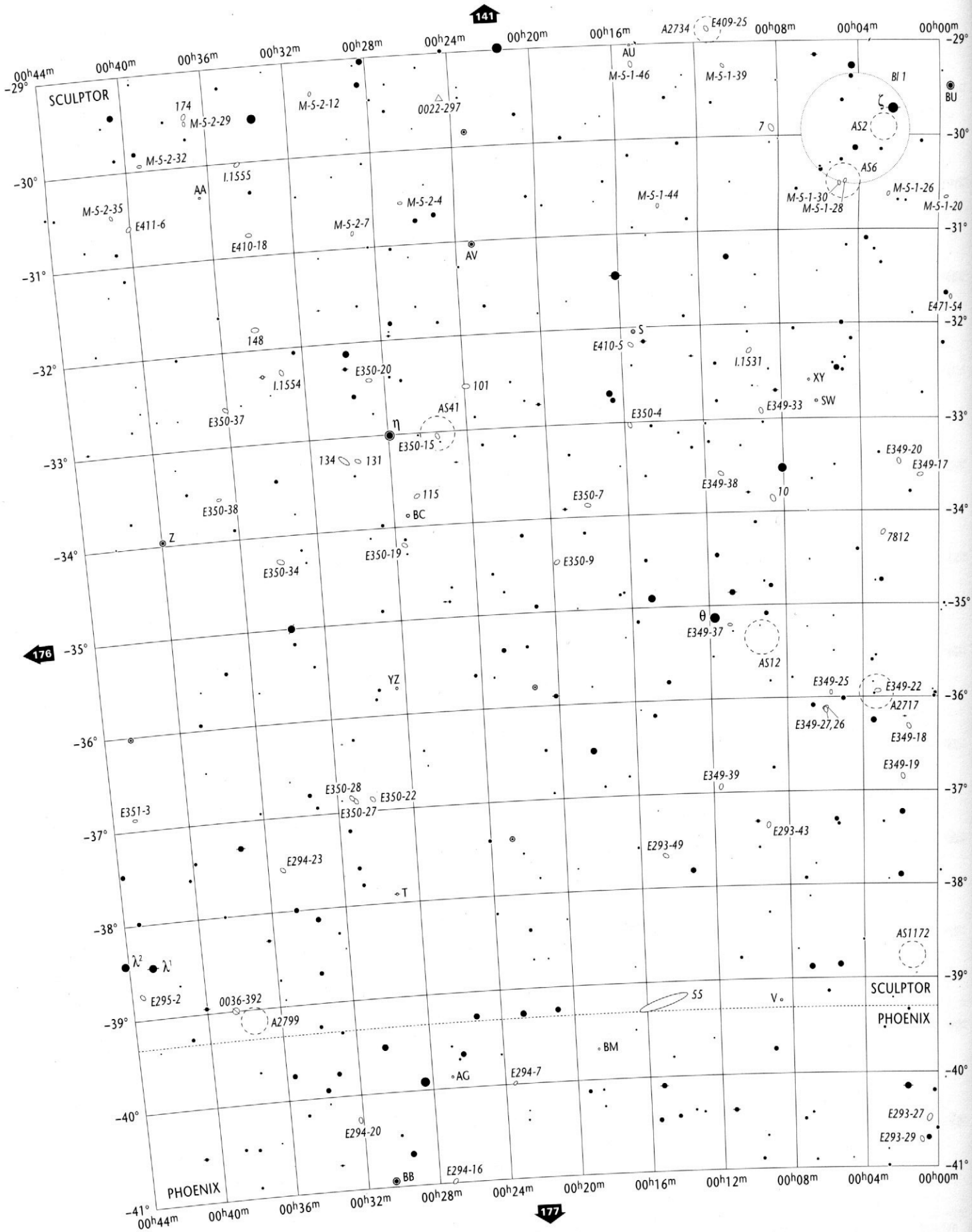


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10'-5' <5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

00h36m to 02h04m
-17° to -30°

CET
SCL, FOR

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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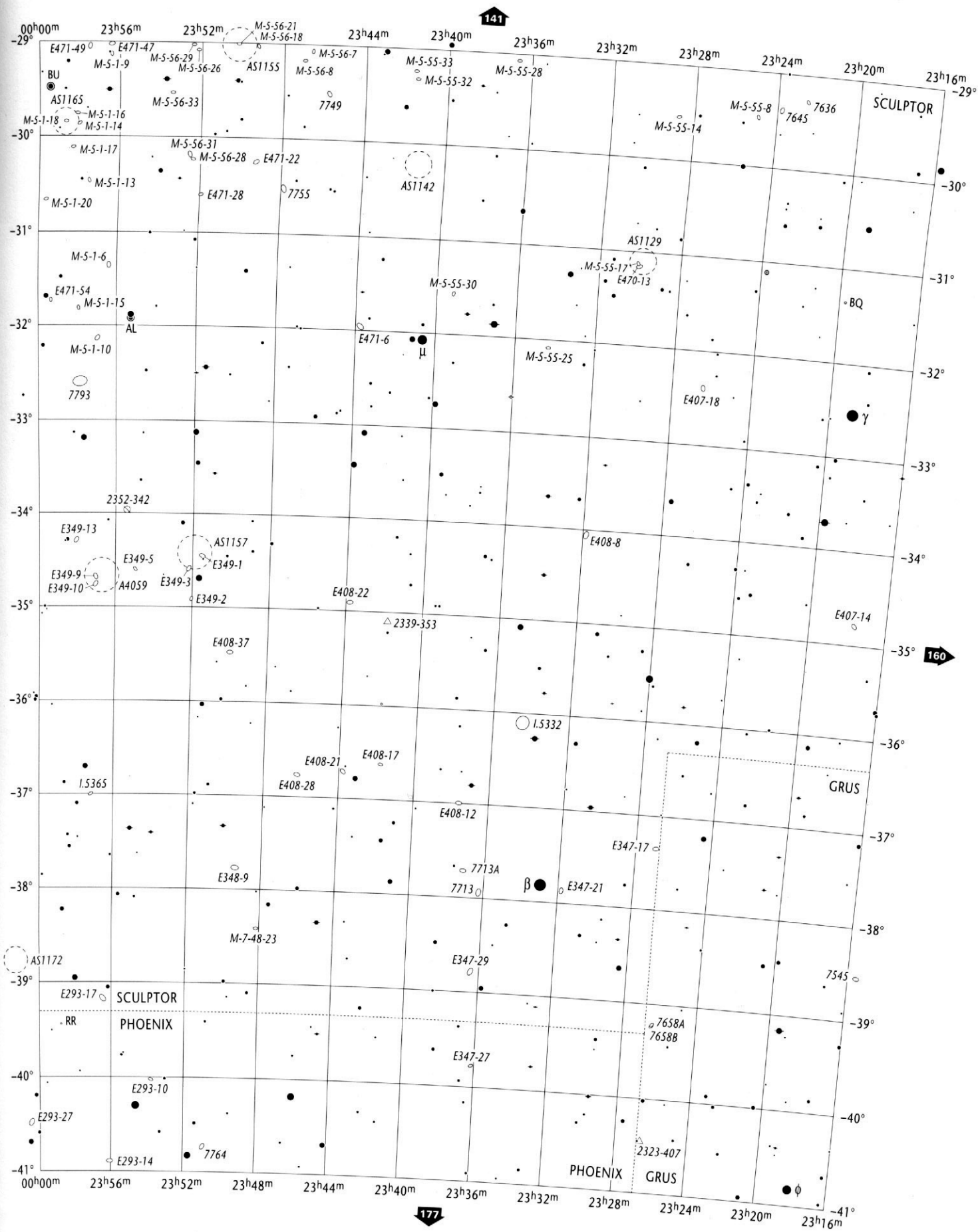
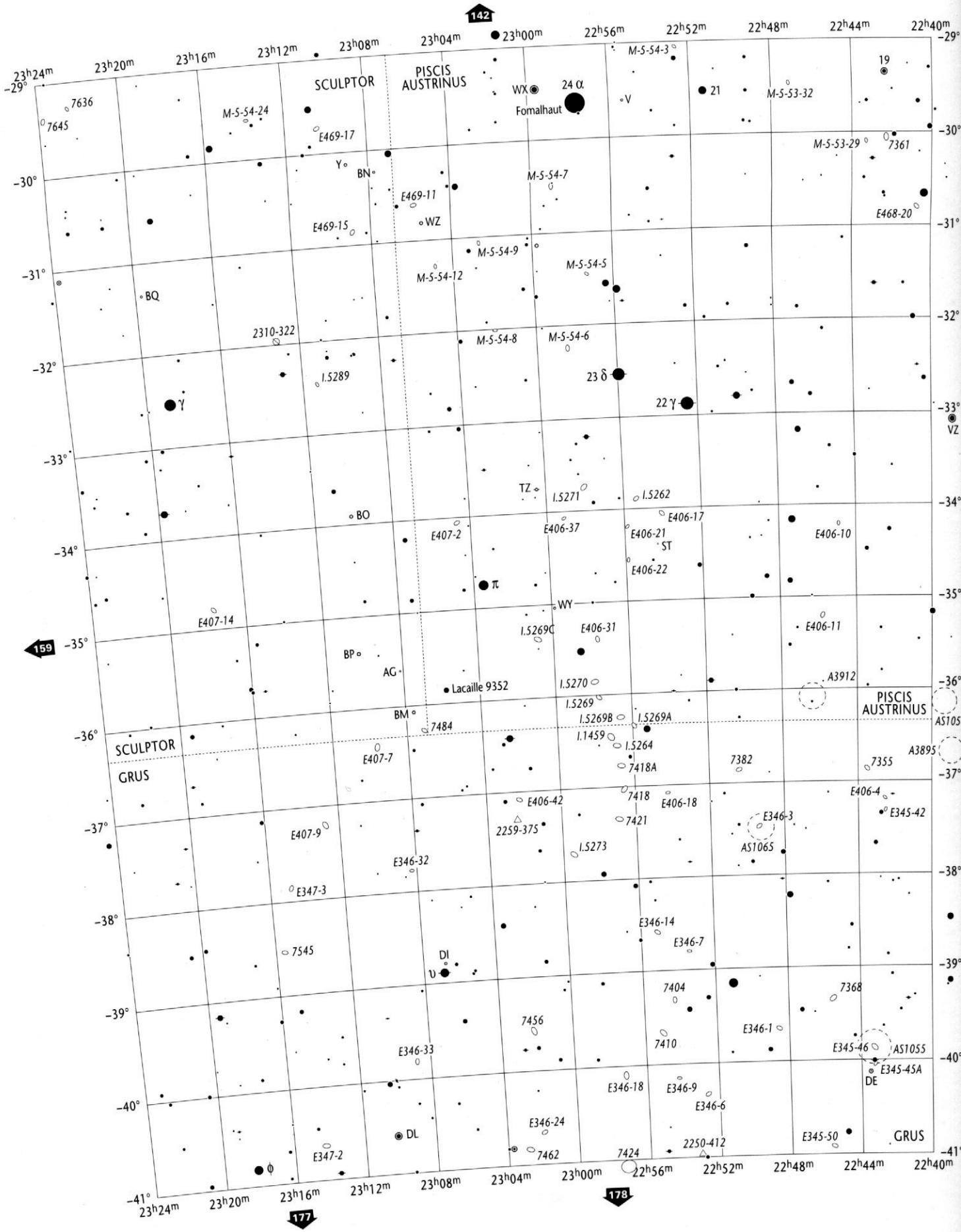


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

00h44m to 23h16m
-29° to -41°

SCL
PHE, GRU

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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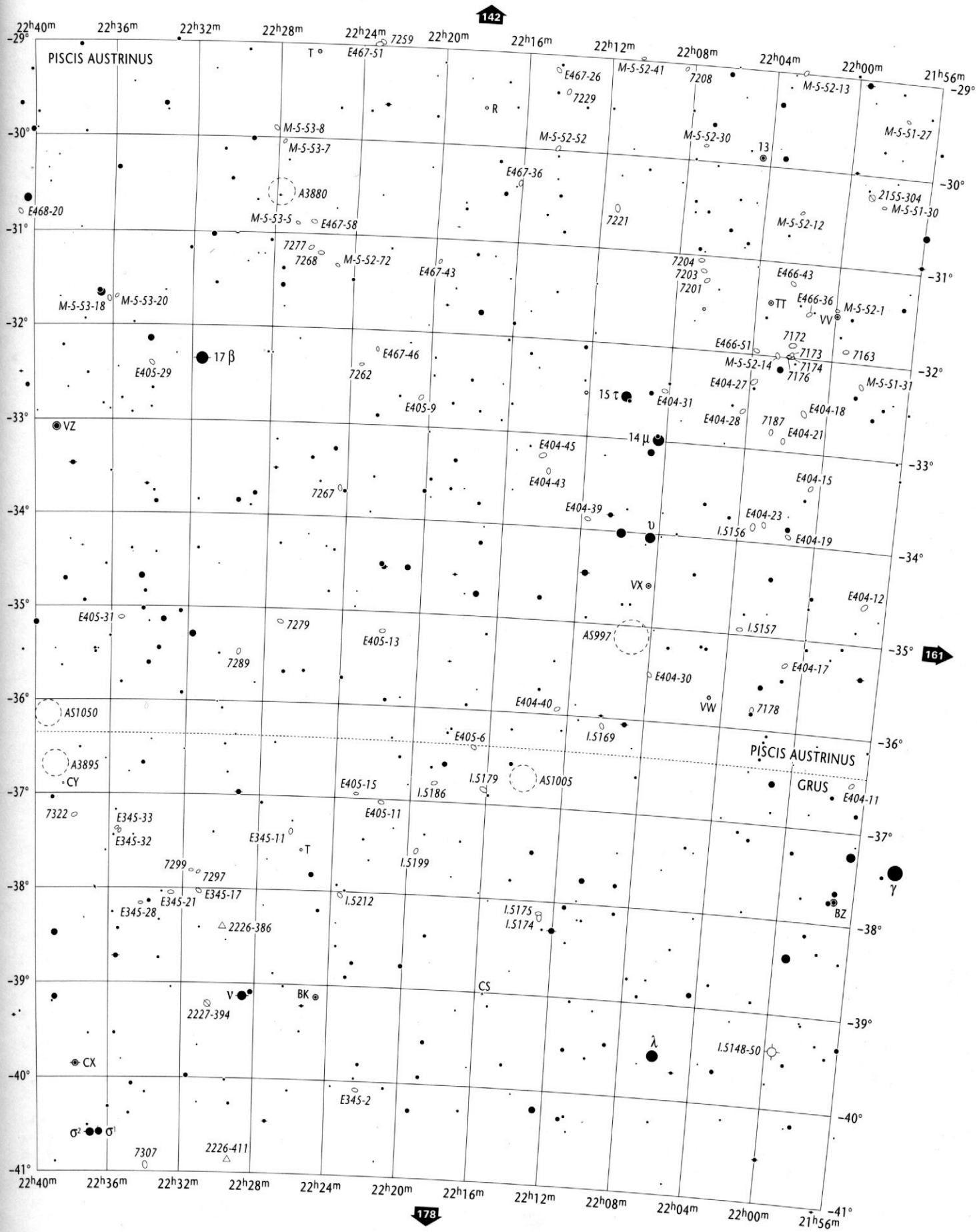
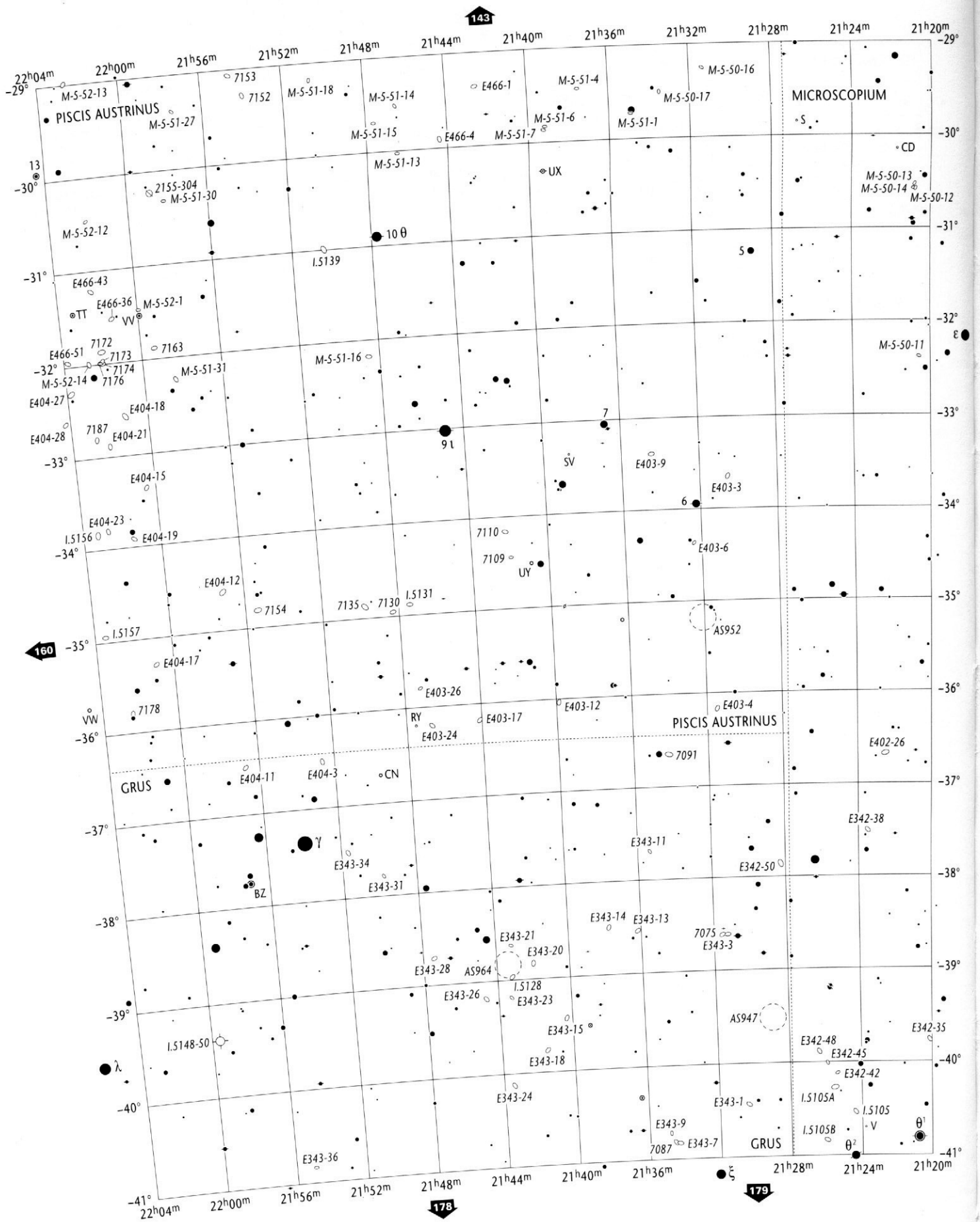


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

21h56m to 23h24m
-29° to -41°

PSA
GRU, SCL

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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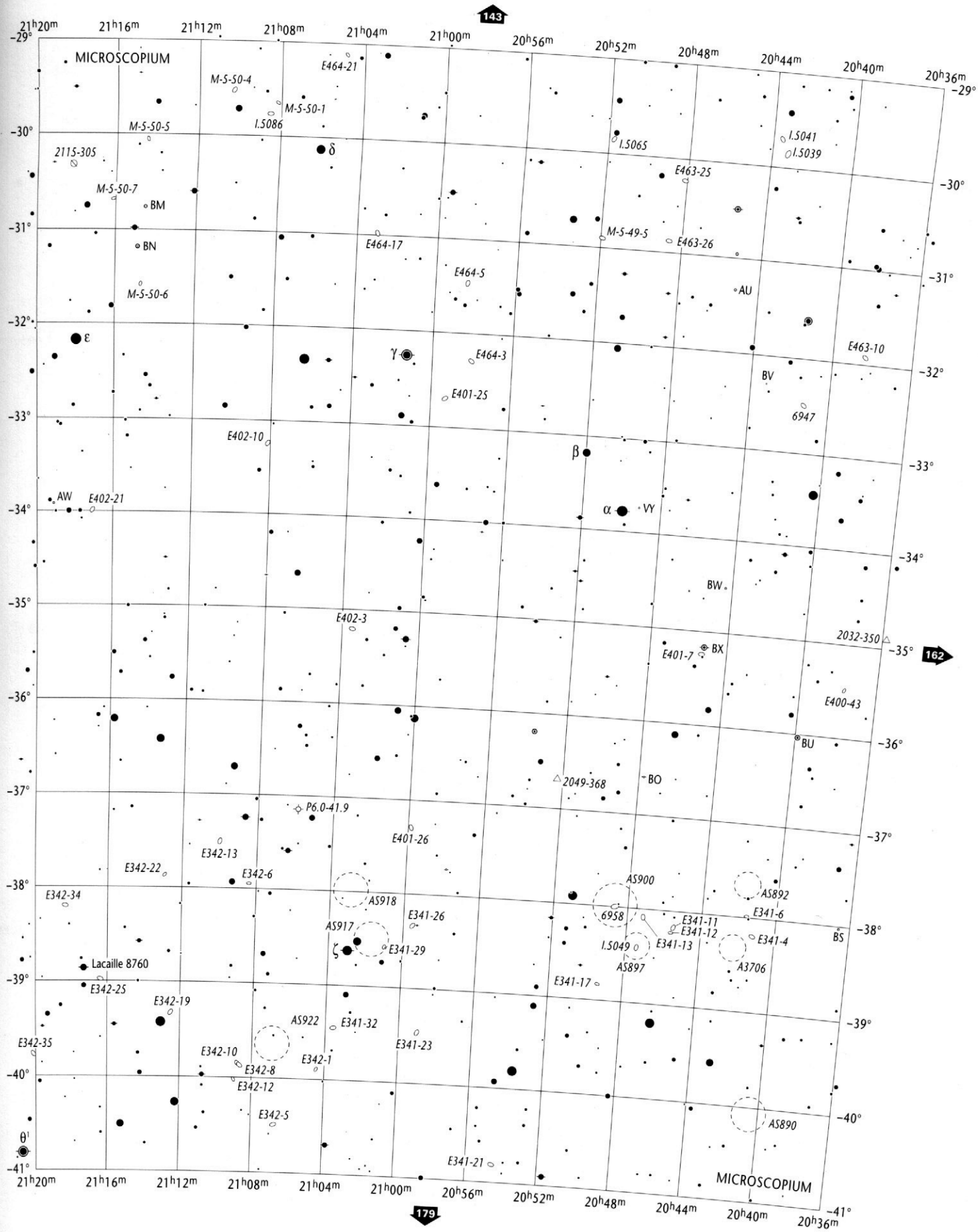
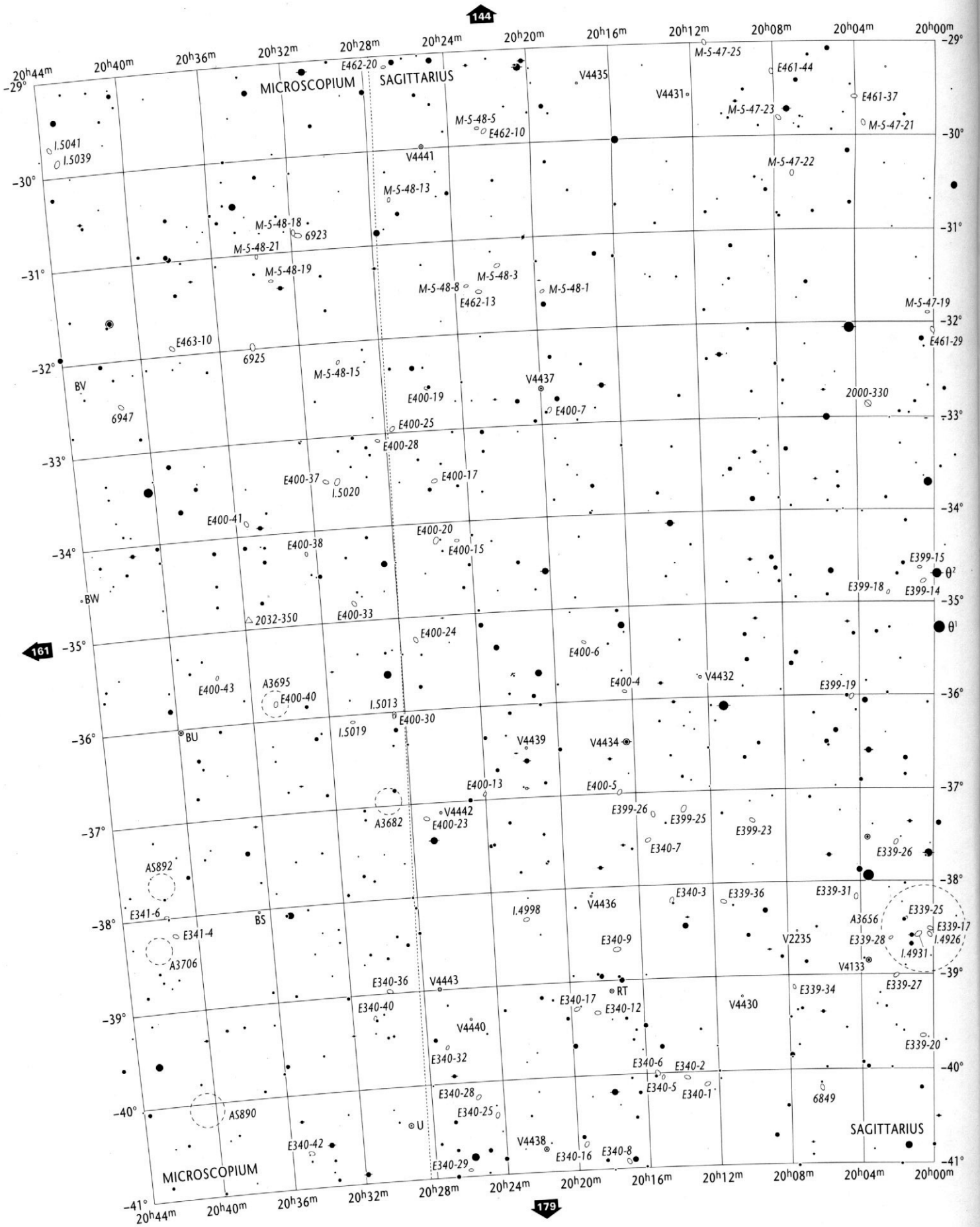


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	20^h36^m to 22^h04^m $-29°$ to $-41°$	MIC PSA, GRU
to scale · < 5'	to scale · < 5'	>30" · 30"-10" · 10"-5" · < 5"	to scale · 10' - 5' · < 5'	> 5' to scale · 5'-2' · 2'-1' · < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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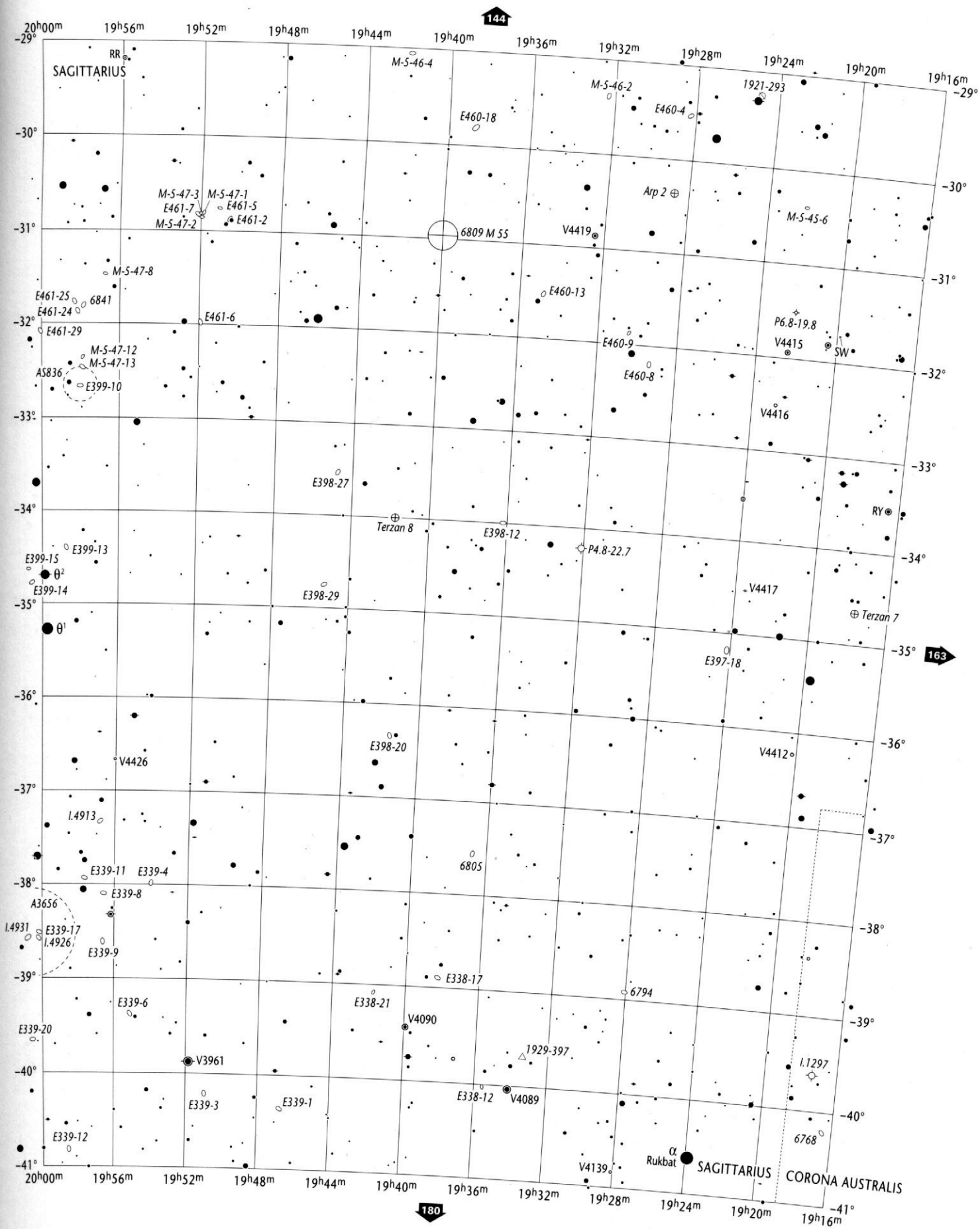
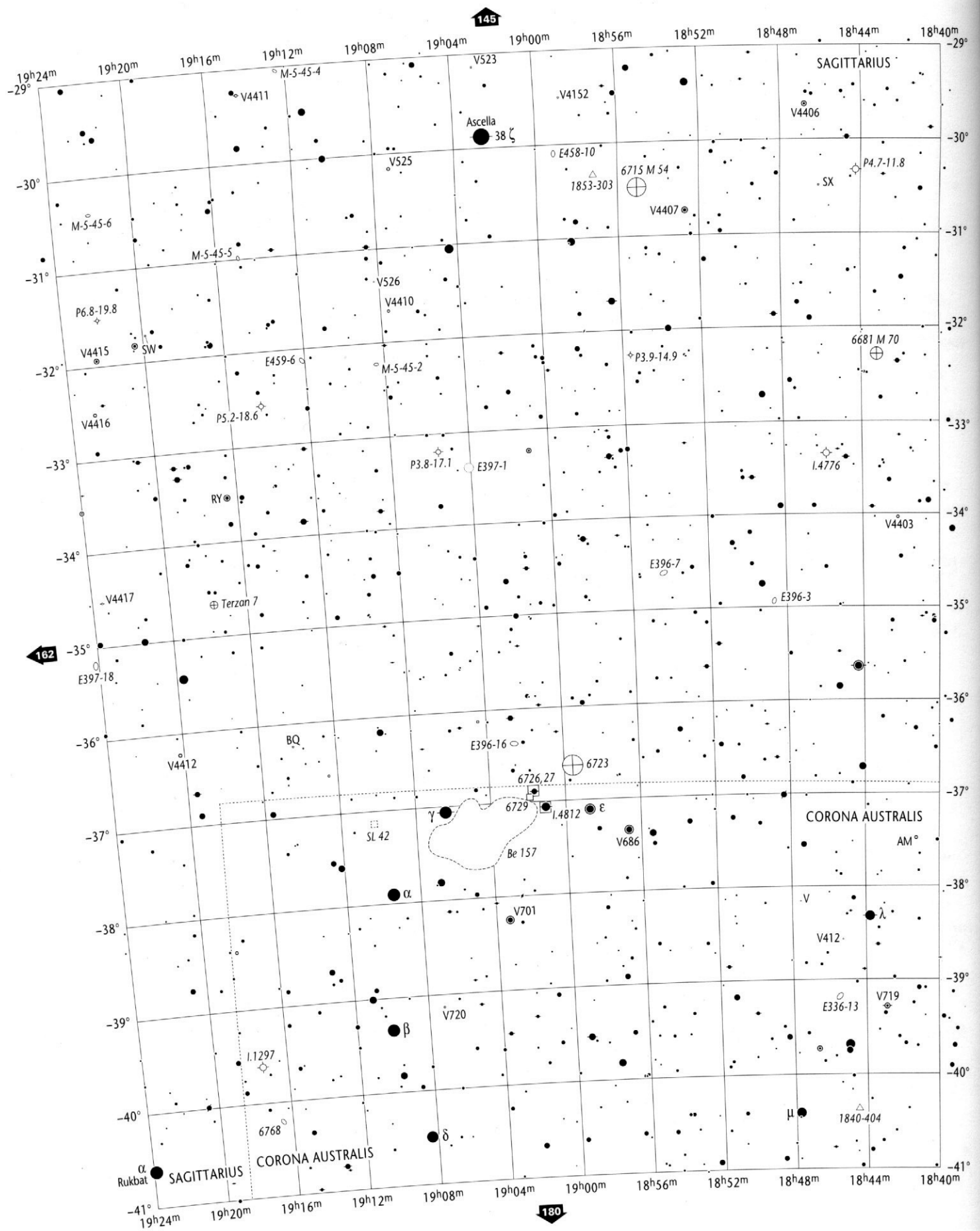


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

19h16m to 20h44m
-29° to -41°

SGR
MIC, CRA

Wil Tirion / Barry Rappaport / Will Remaklus



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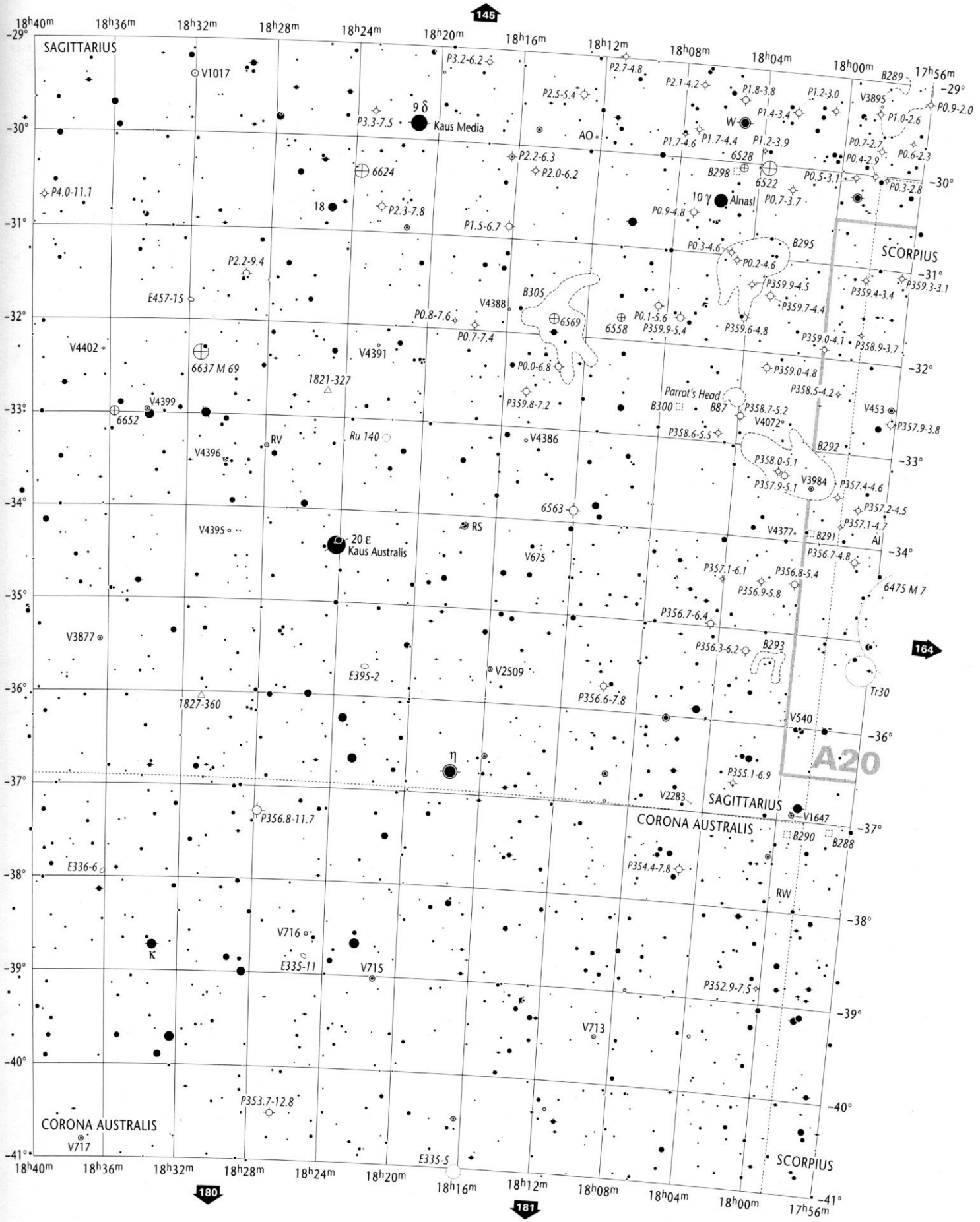
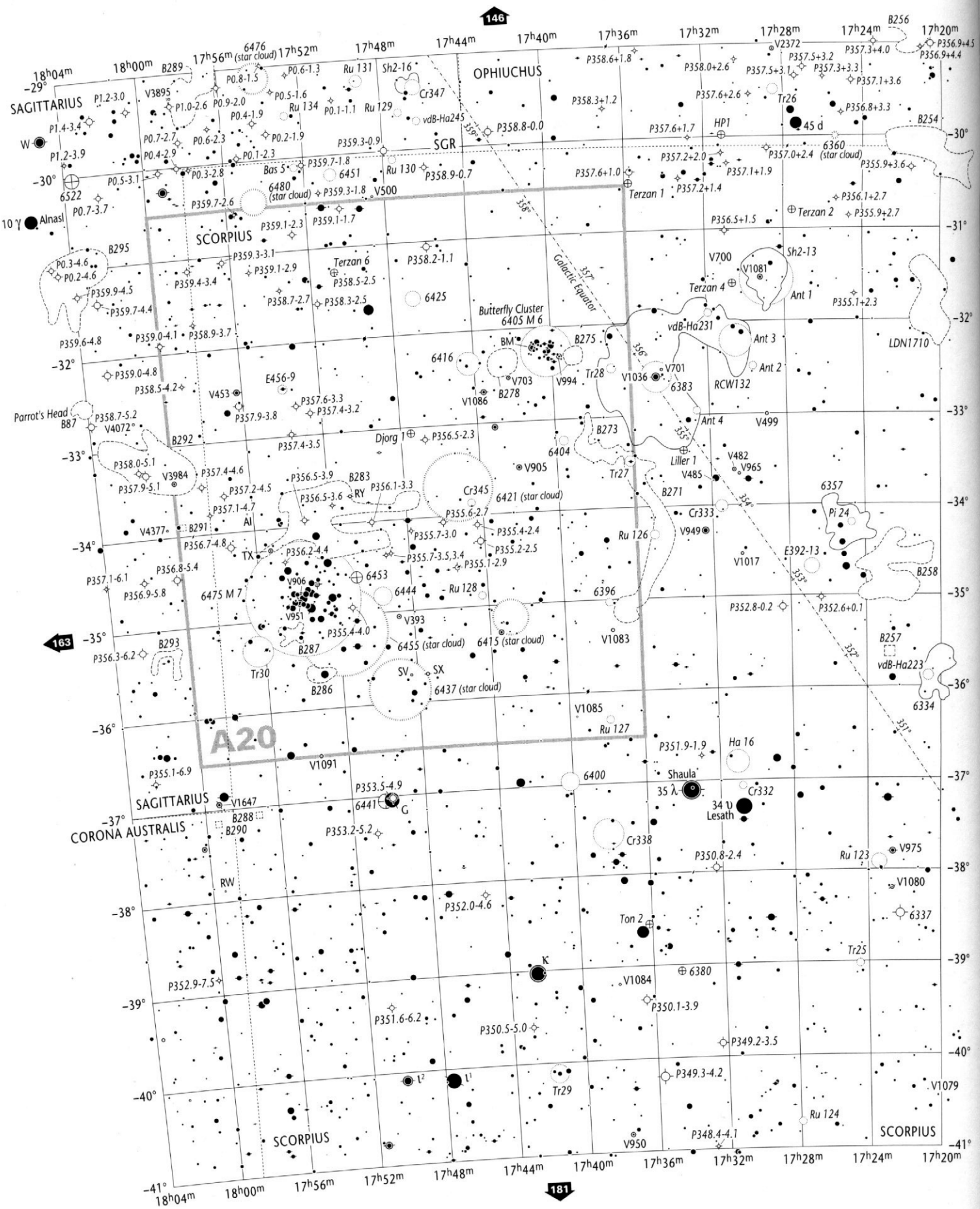


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

17^h56^m to 19^h24^m
$-29°$ to $-41°$

SGR
CRA, SCO

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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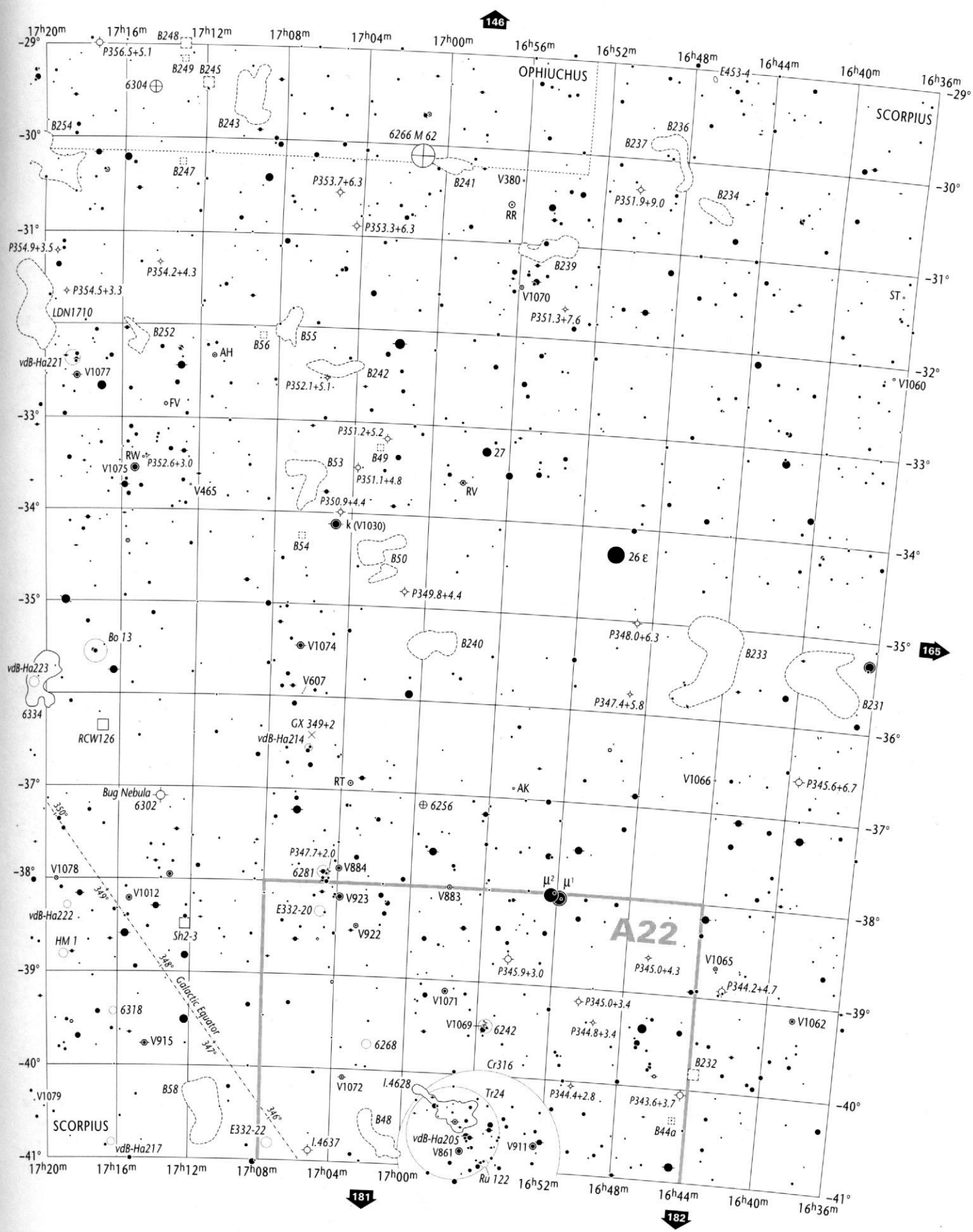
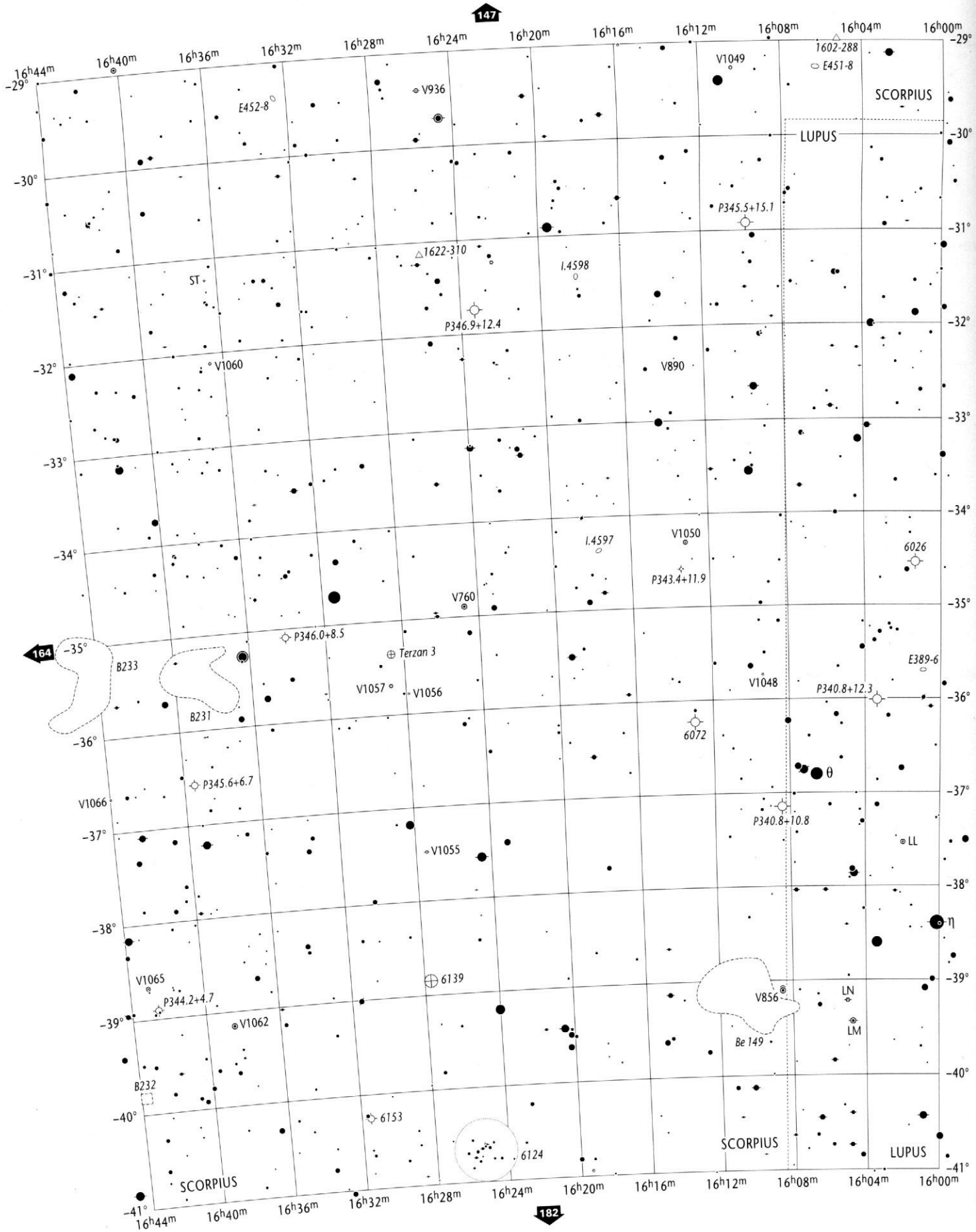


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30', 30'-10', 10'-5', < 5'	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

16h36m to 18h04m
-29° to -41°

SCO
SGR, OPH, CRA

Will Tirion / Barry Rappaport / Willi Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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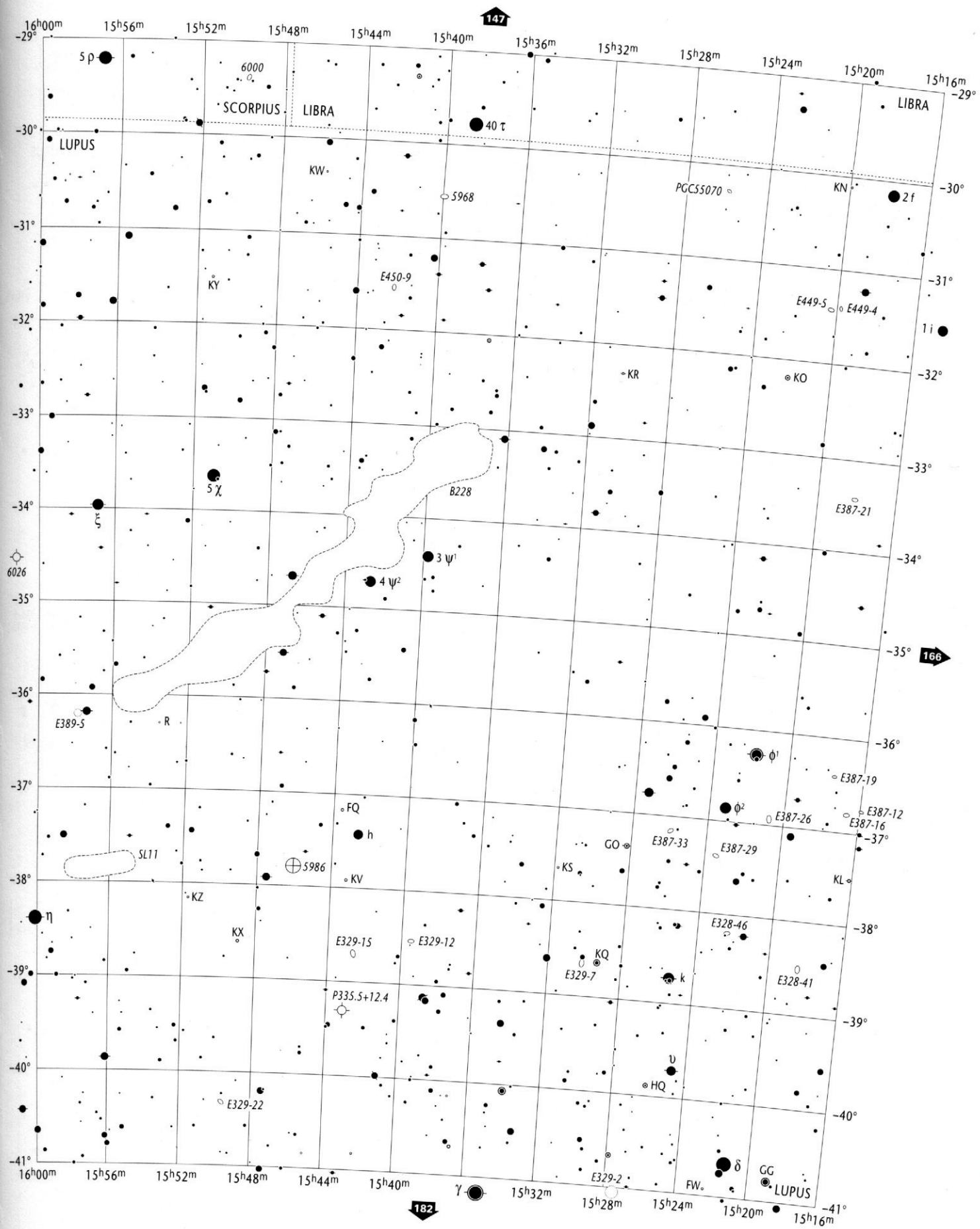
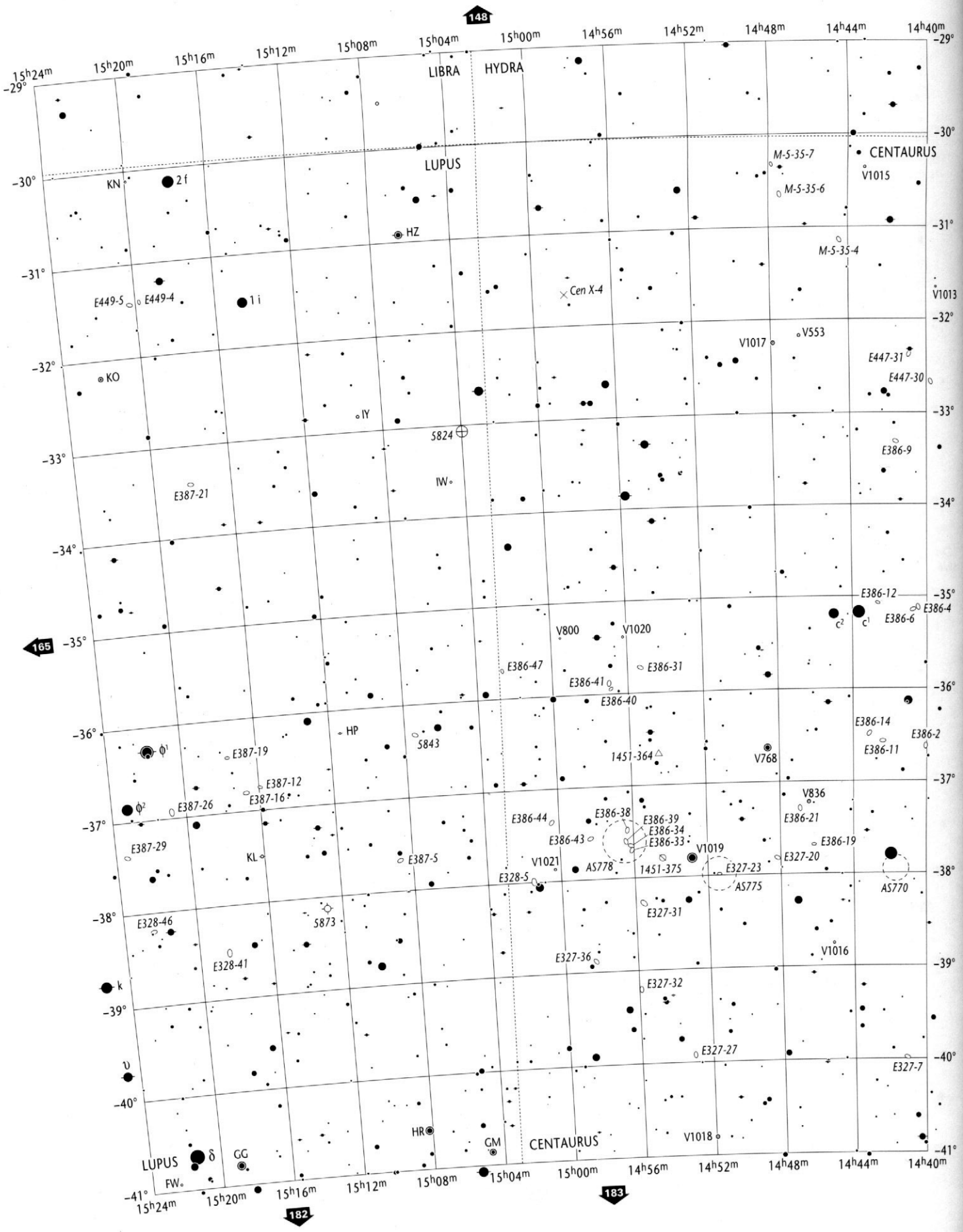


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30", 30"-10", 10"-5", < 5"	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

15h16m to 16h44m
-29° to -41°

LUP
SCO, LIB

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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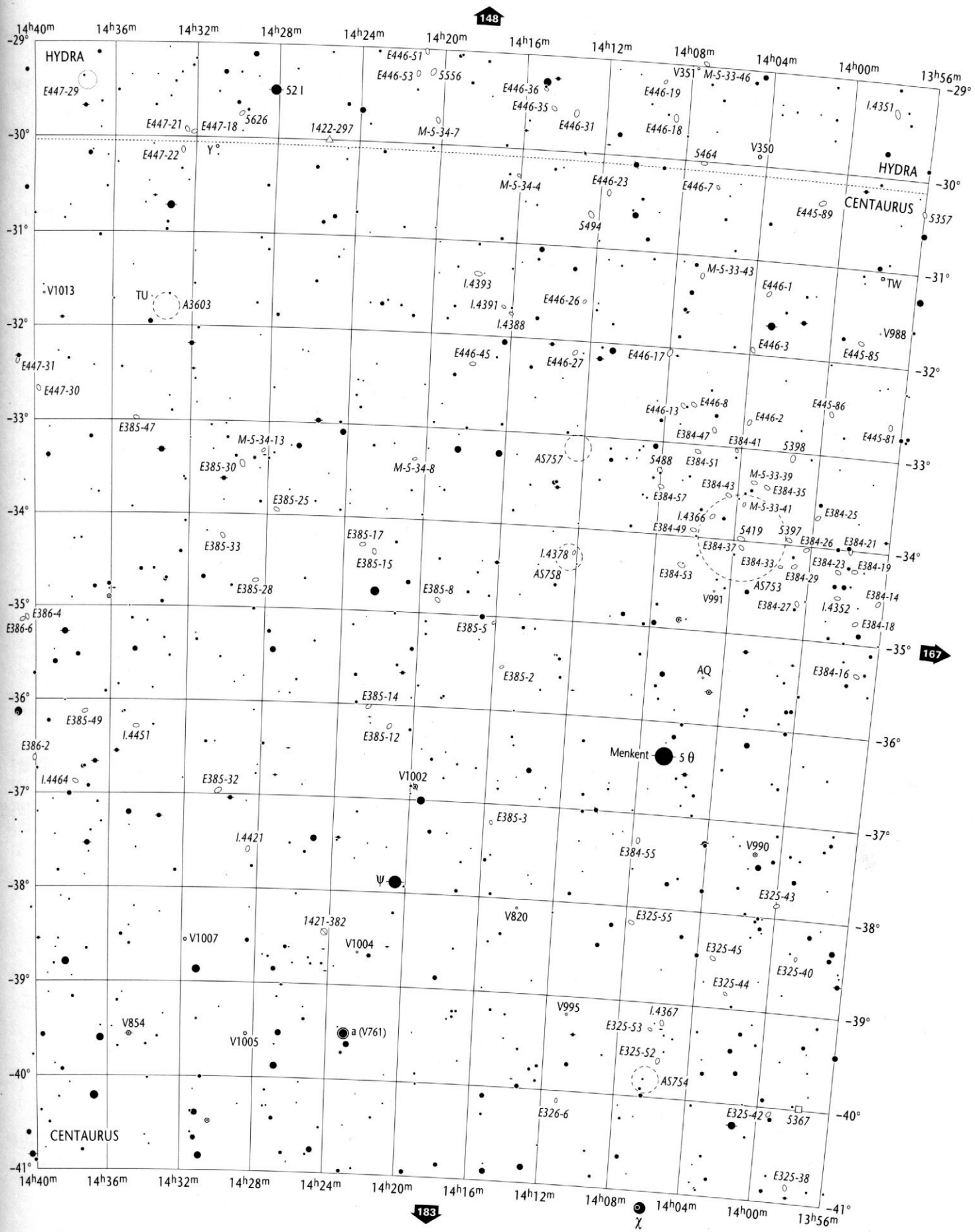
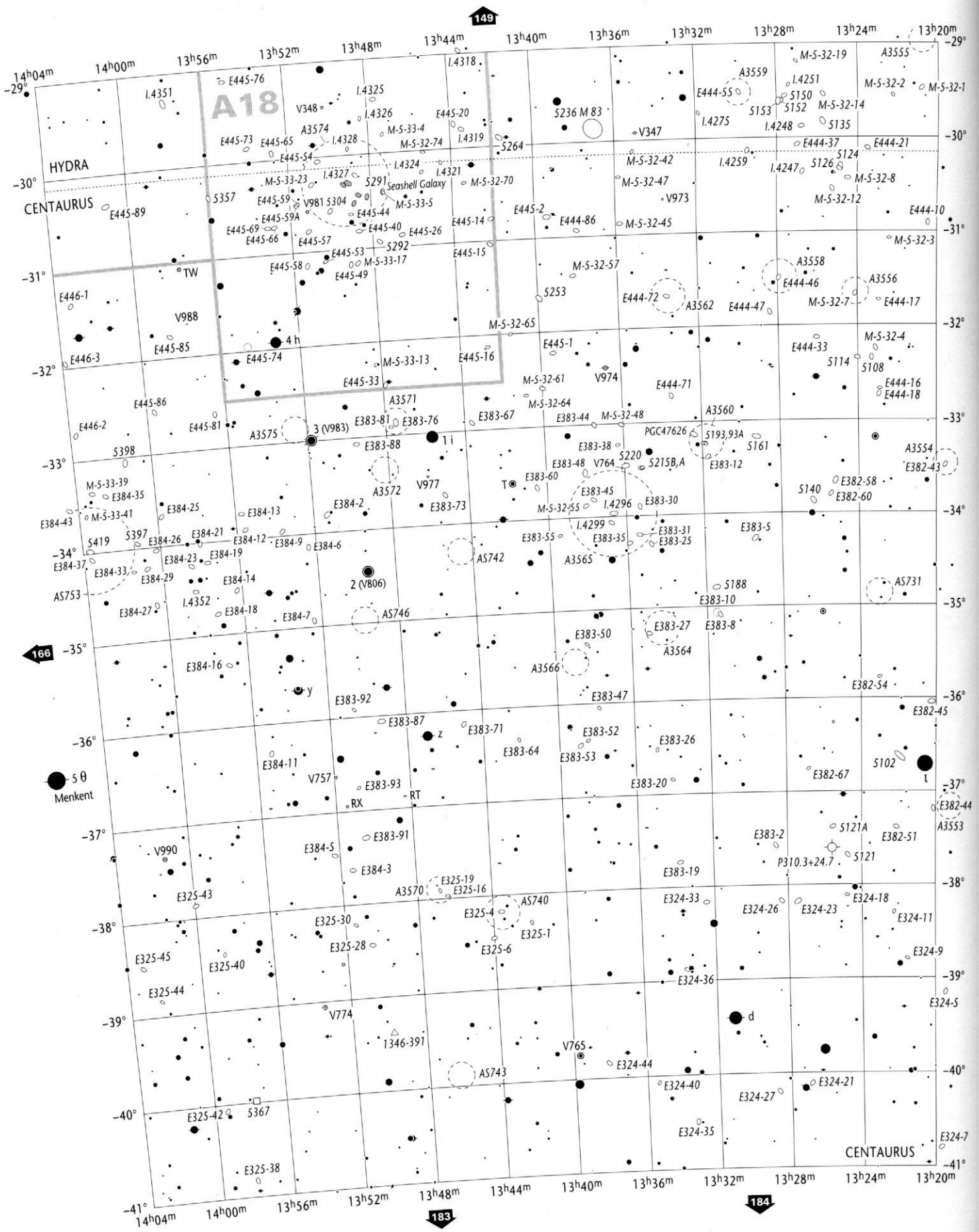


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

13h56m to 15h24m
-29° to -41°

CEN
LUP, HYA, LIB

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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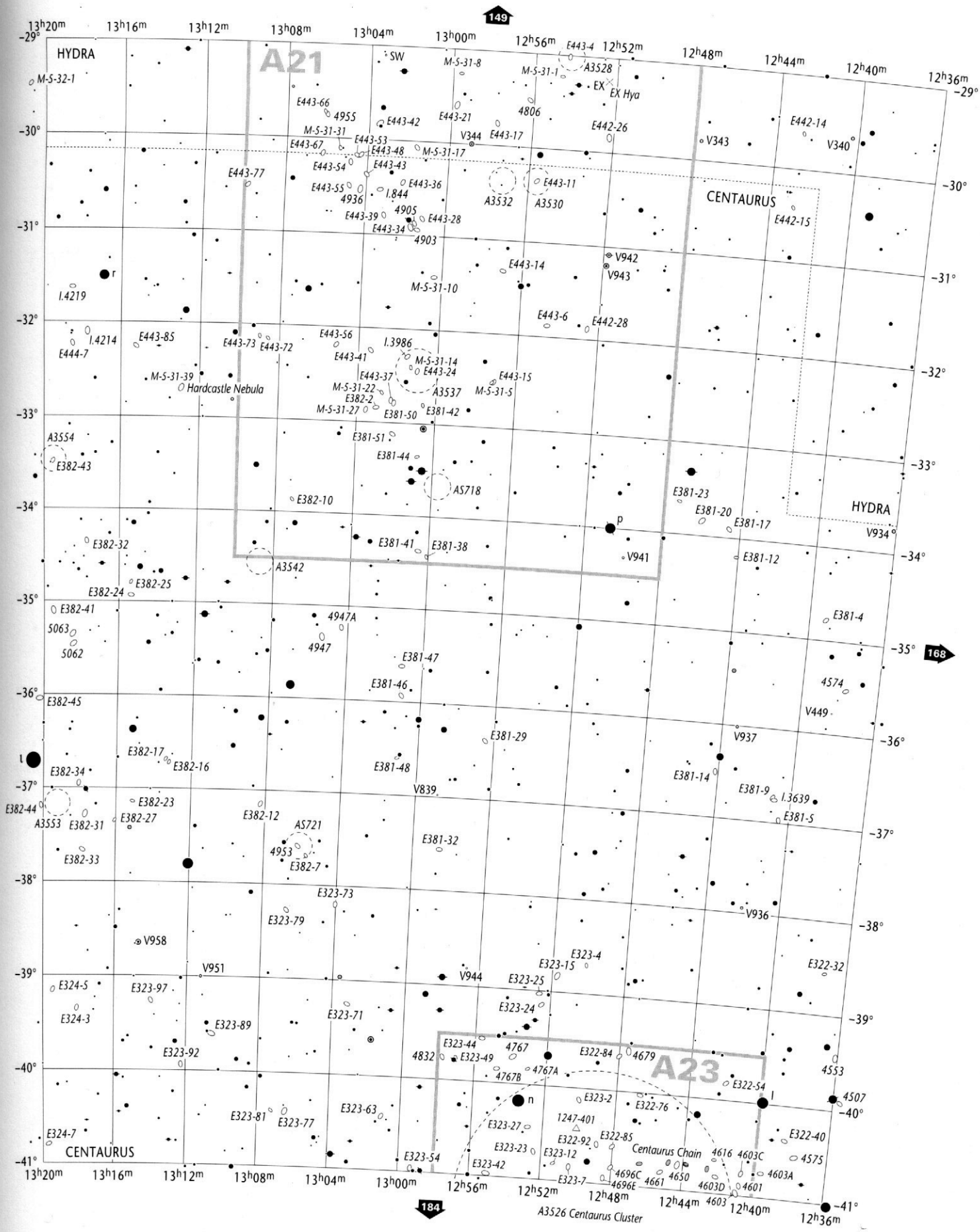
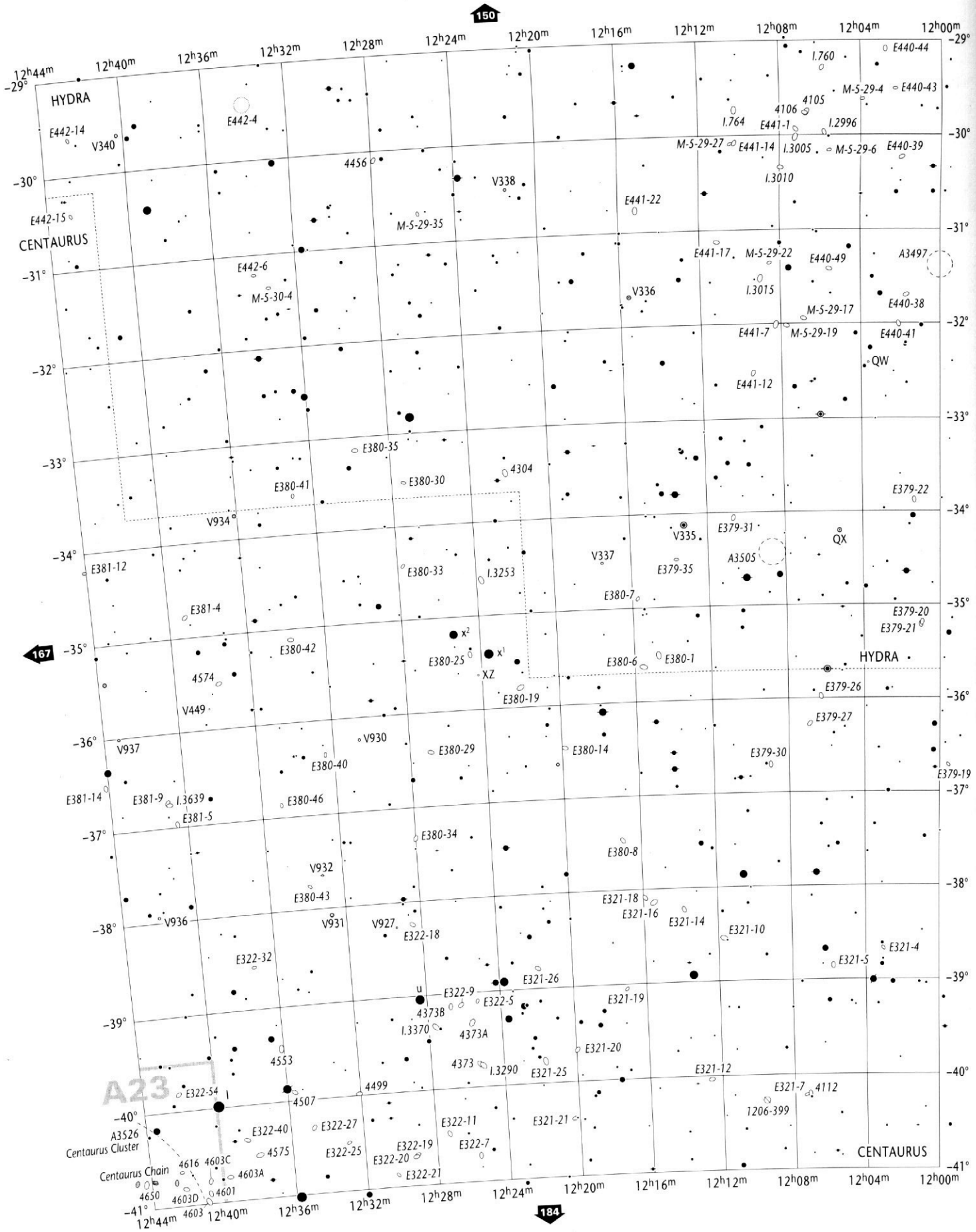


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	**12h36m to 14h04m -29° to -41°**	**CEN HYA**

Wil Tirion / Barry Rappaport / Will Remaklus



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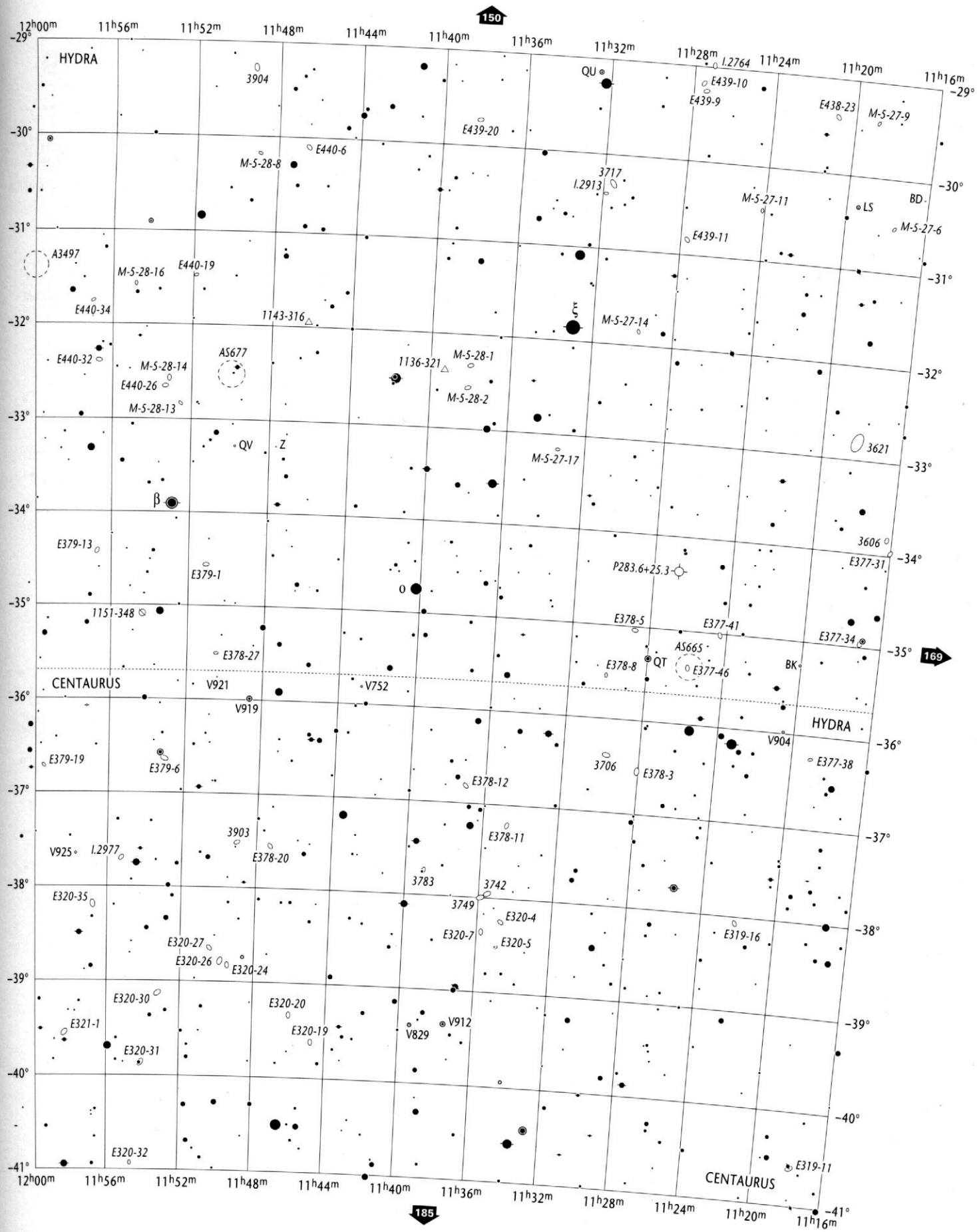
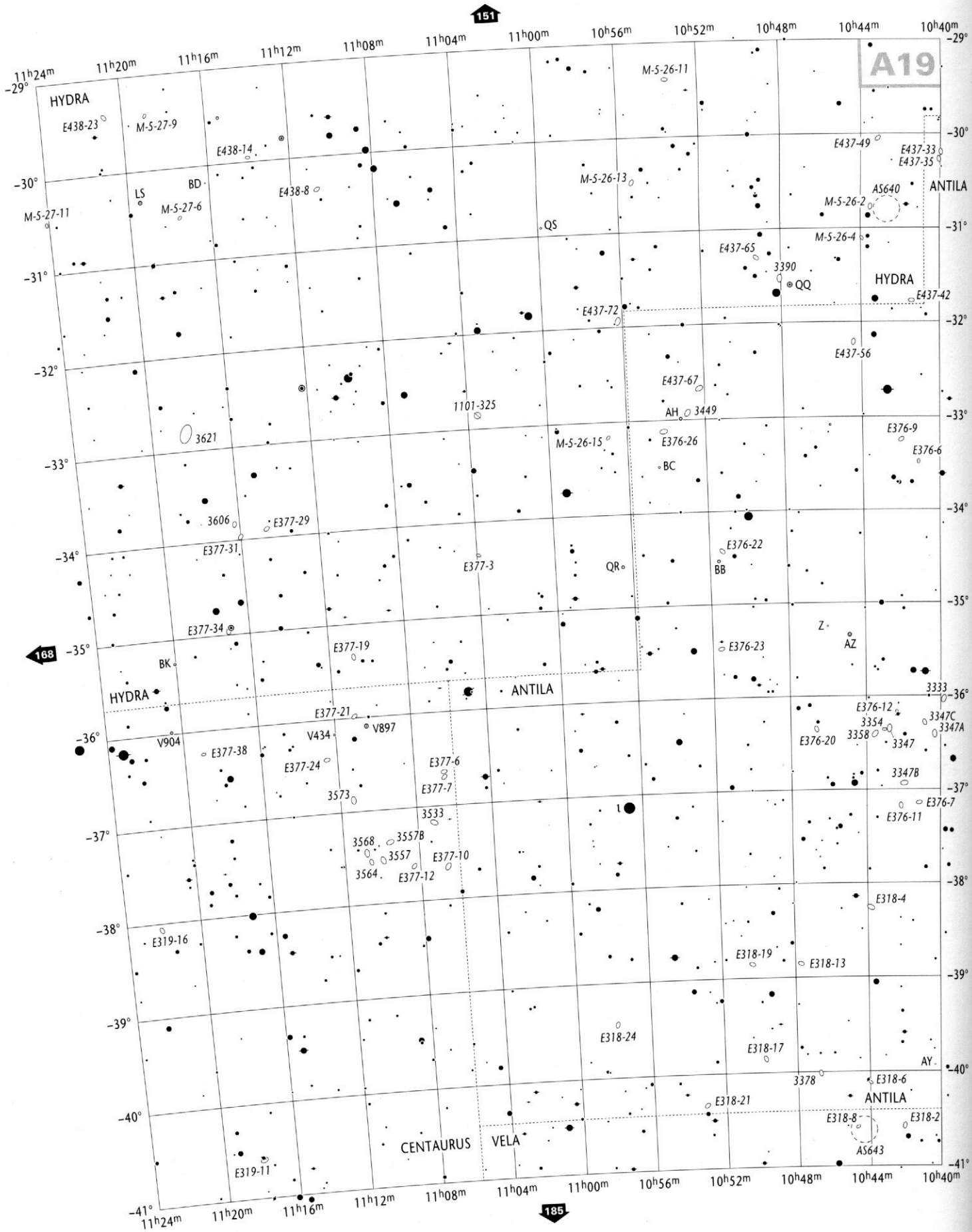


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	11^h16^m to 12^h44^m $-29°$ to $-41°$	HYA CEN
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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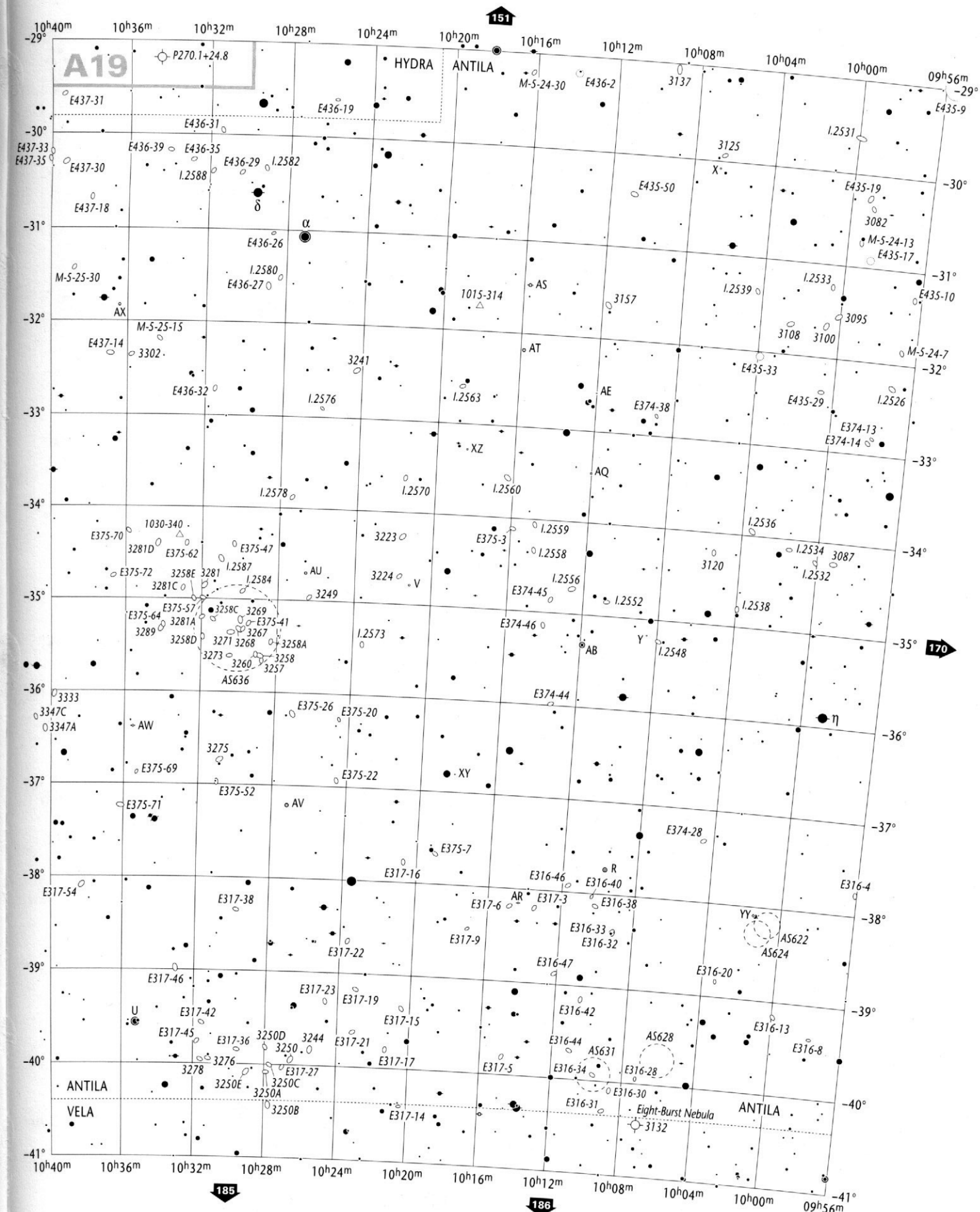
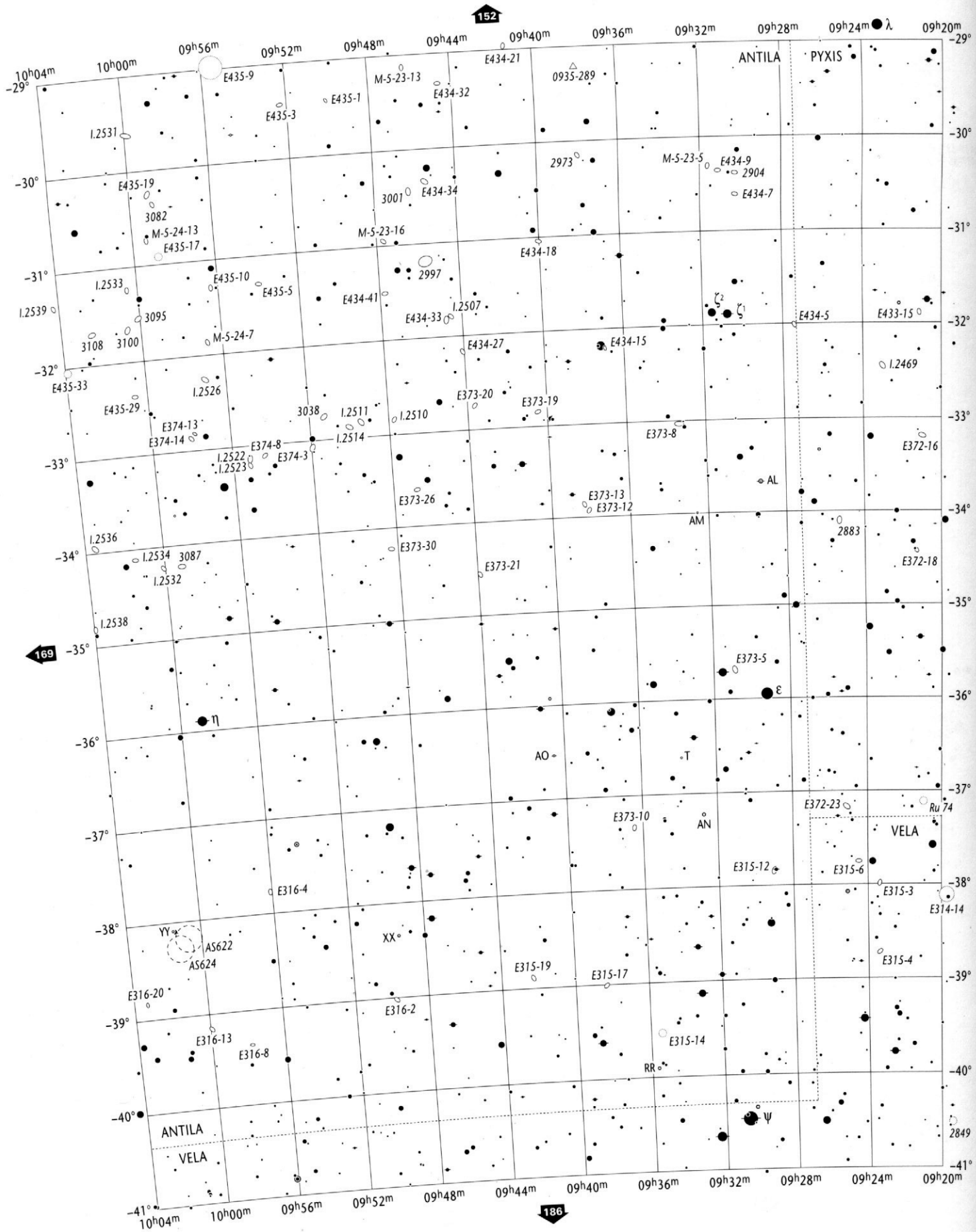


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

09h56m to 11h24m
-29° to -41°

ANT
HYA, CEN, VEL

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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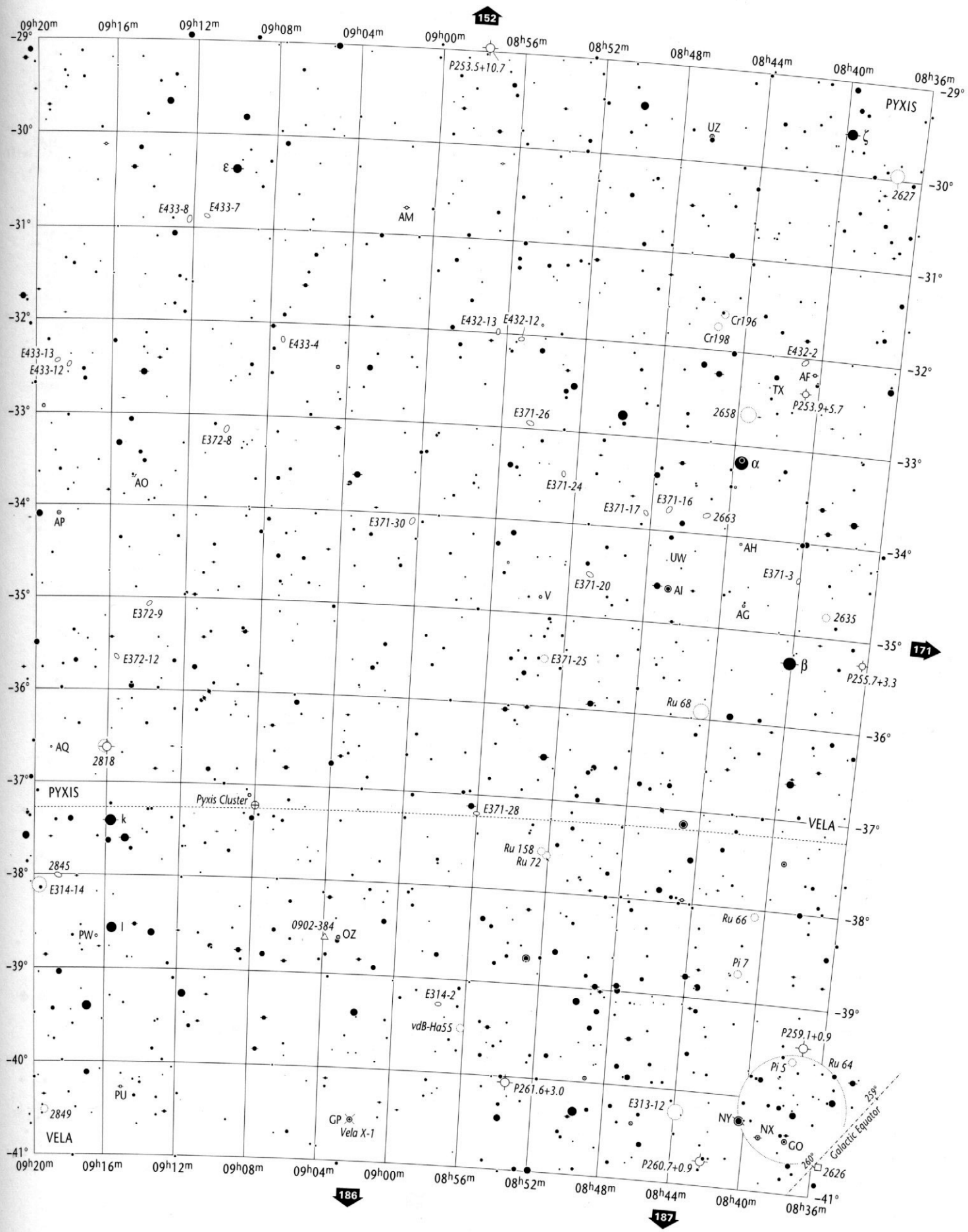
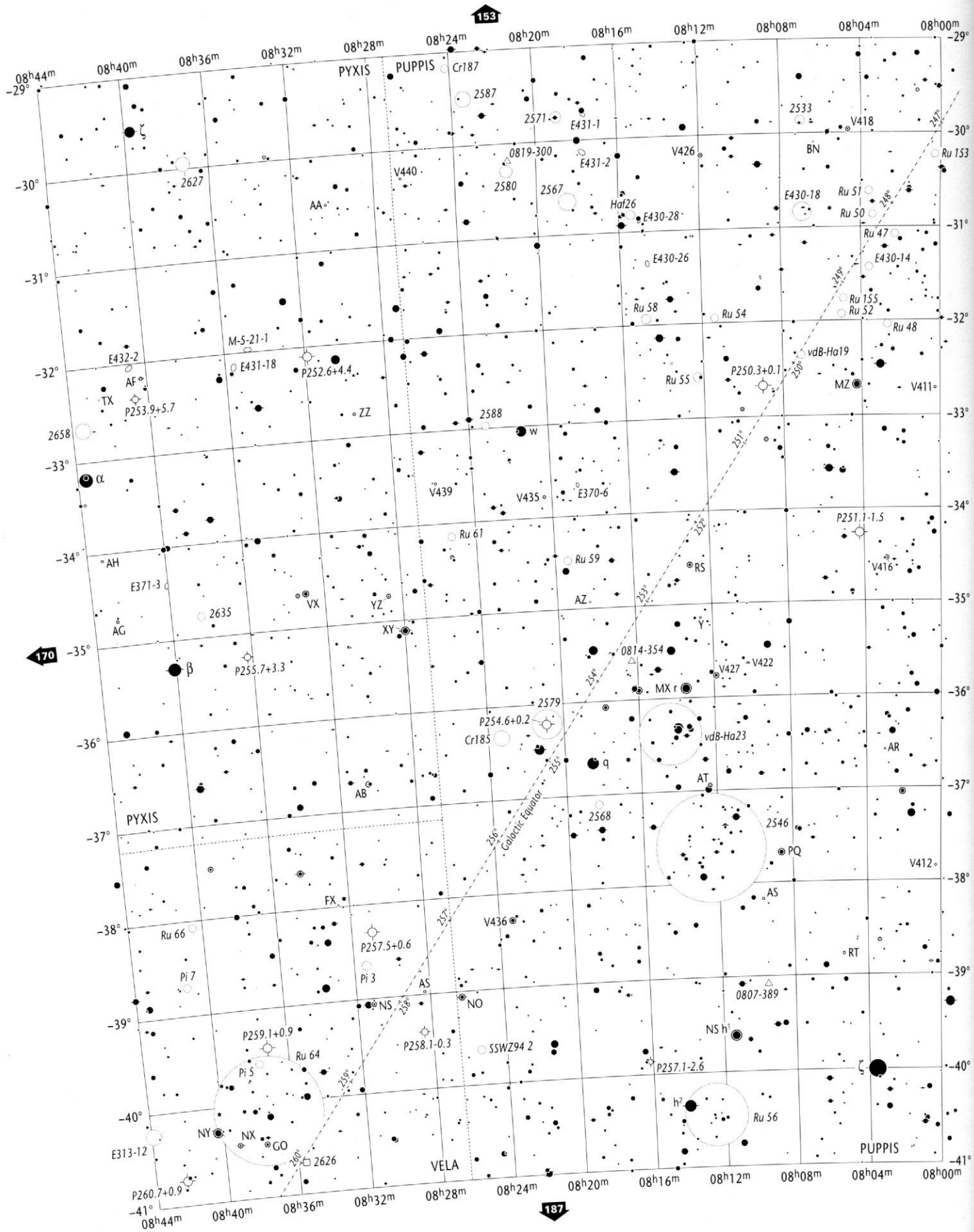


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	08^h36^m to 10^h04^m $-29°$ to $-41°$	PYX ANT, VEL
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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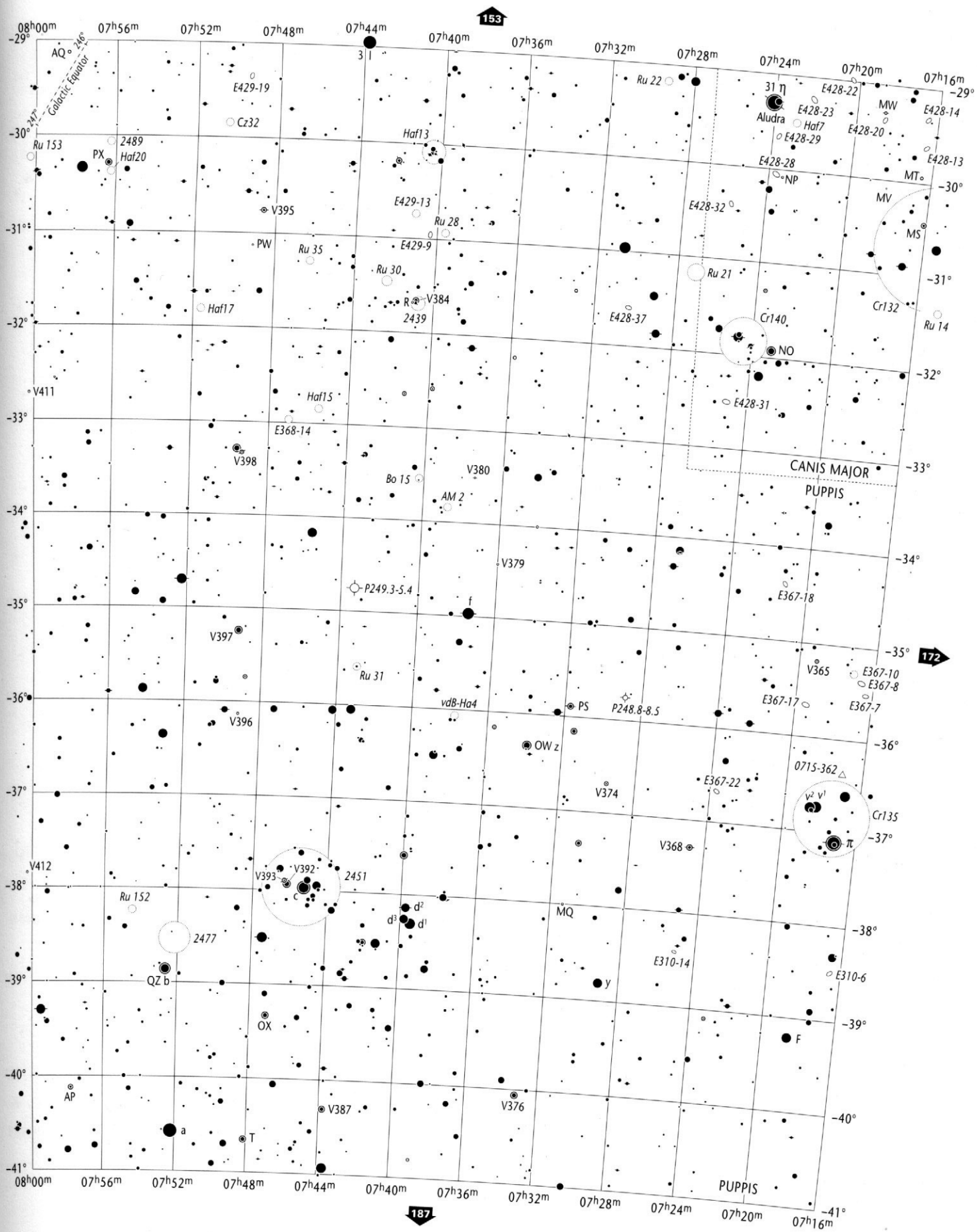
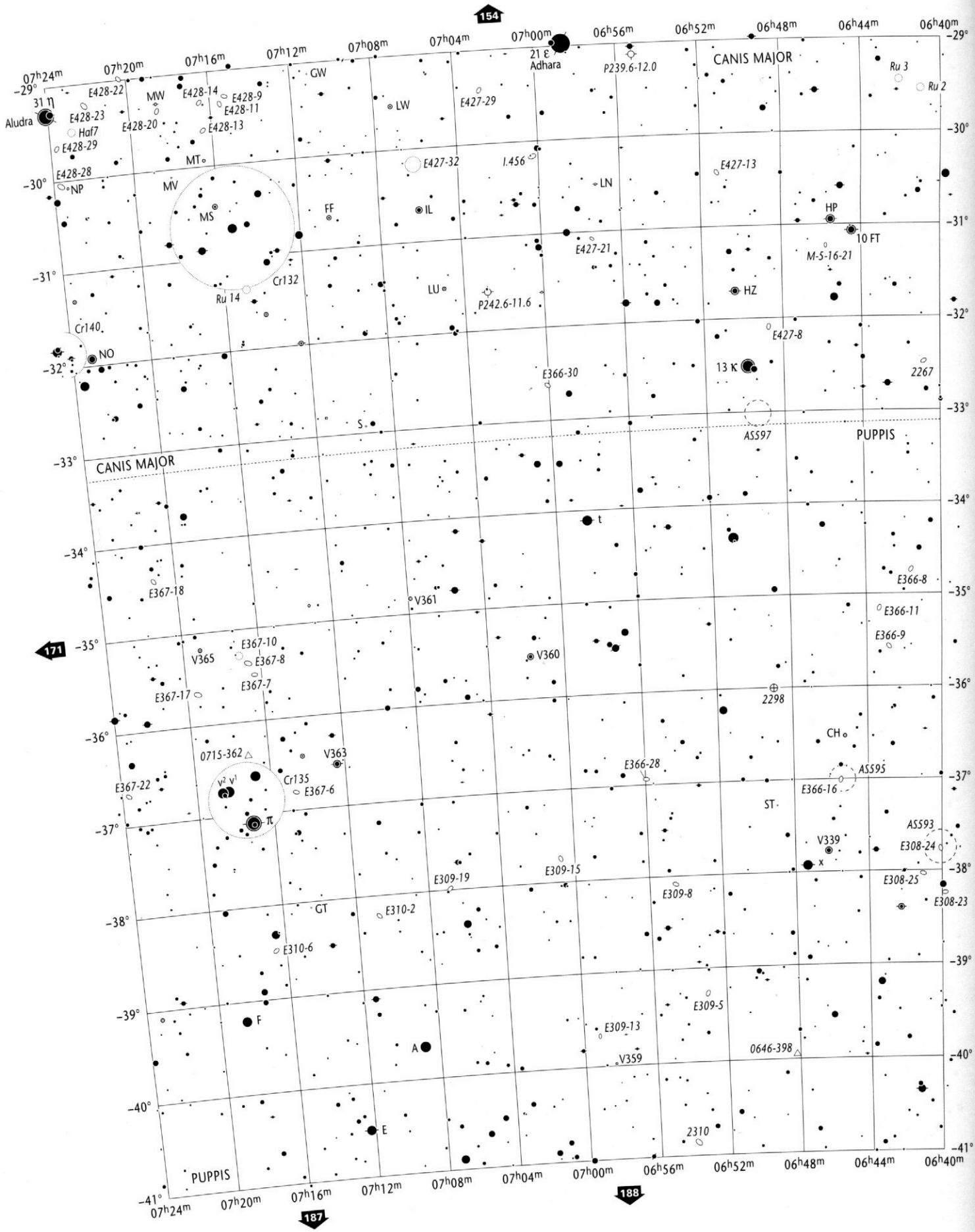


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

07h16m to 08h44m
-29° to -41°

PUP
PYX, VEL, CMA

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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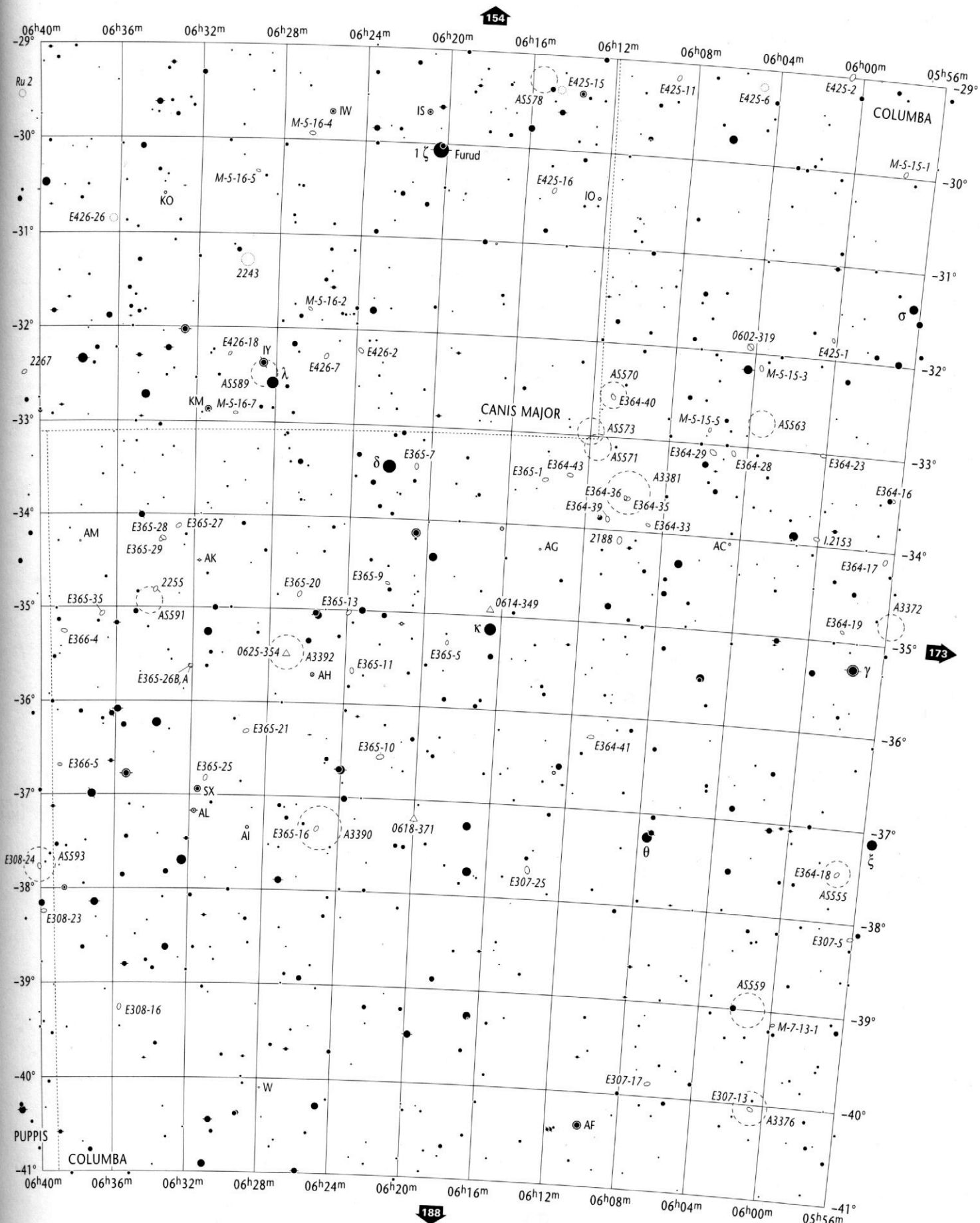
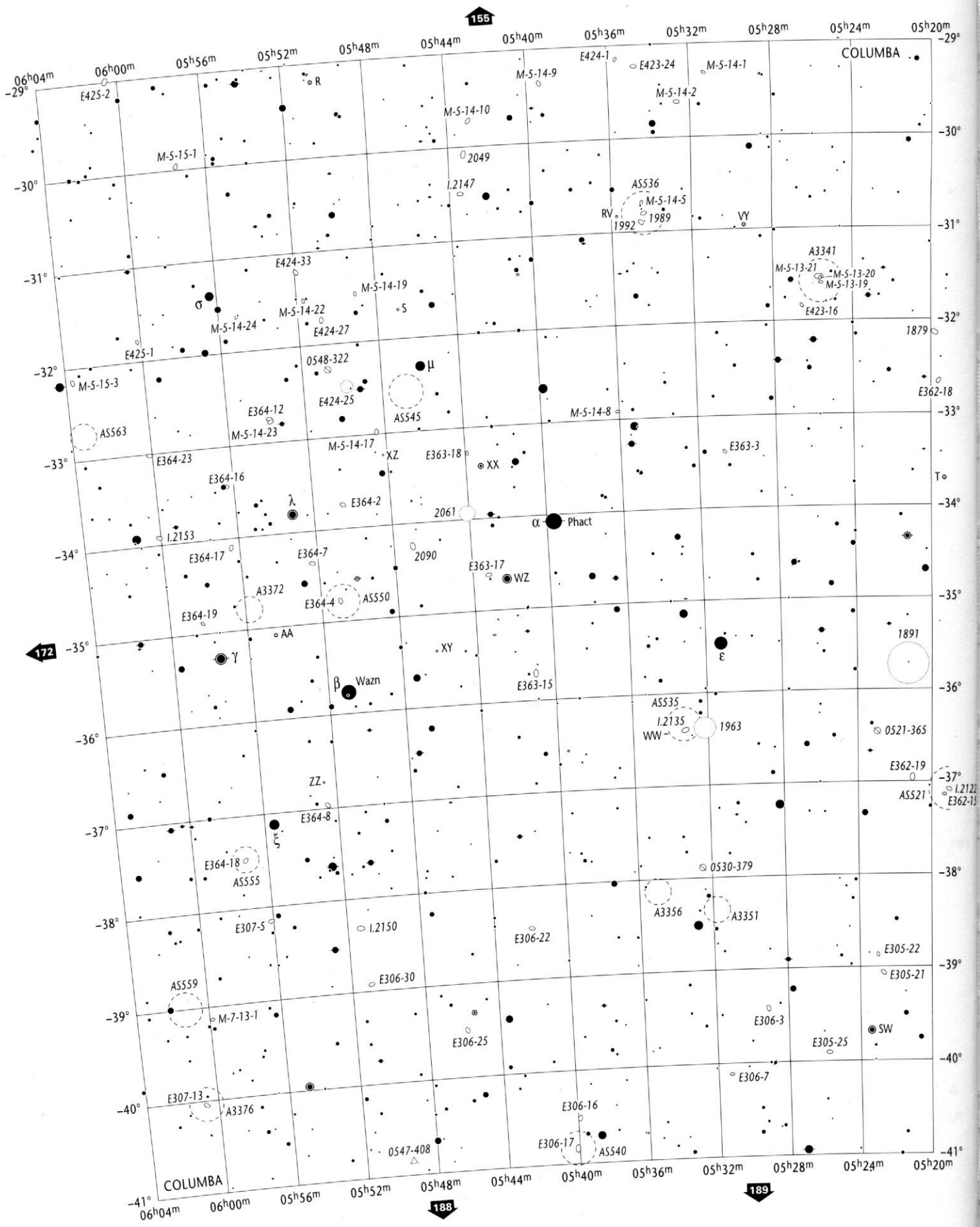


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	05h56m to 07h24m -29° to -41°	COL PUP, CMA
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale		

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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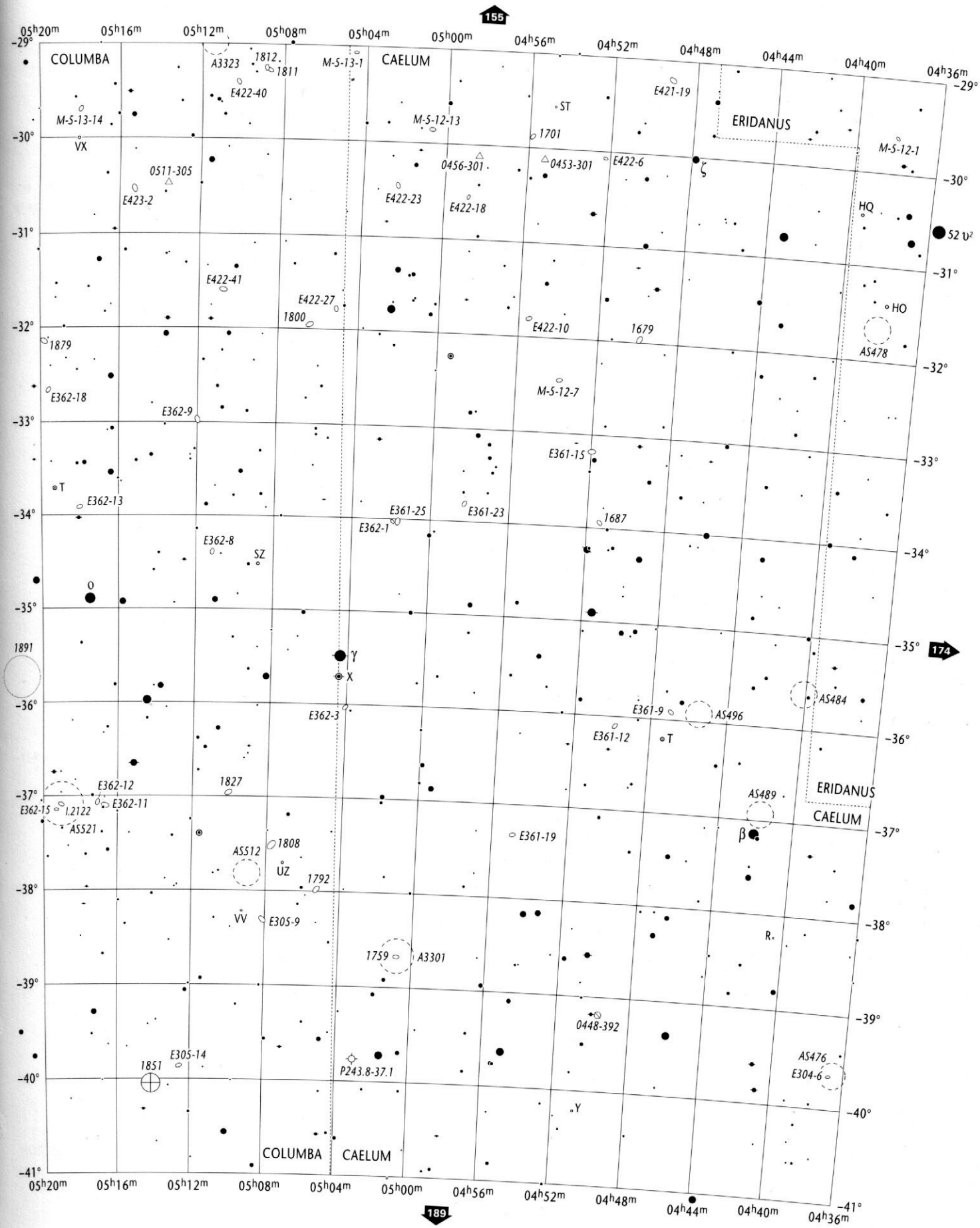
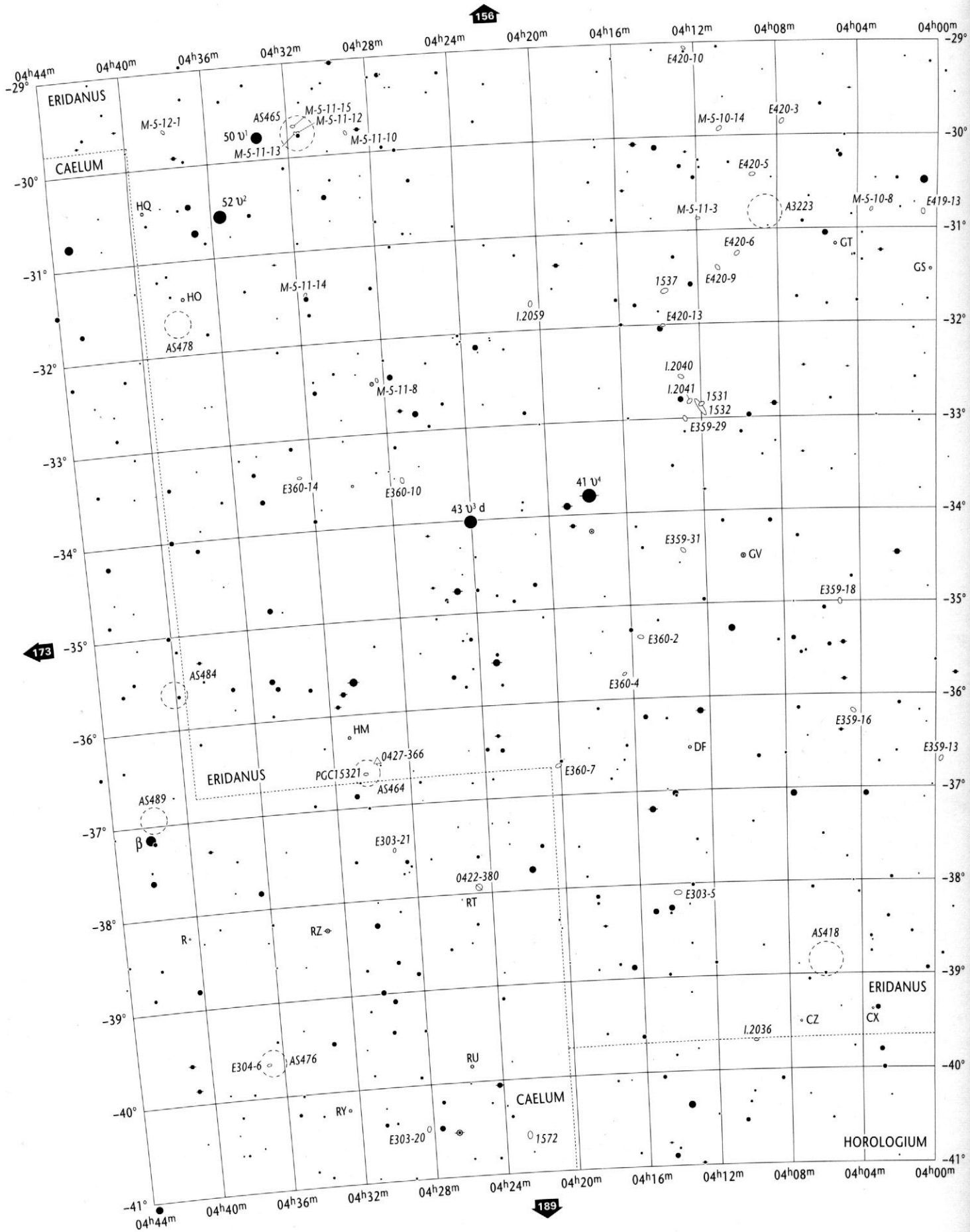


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

04h36m to 06h04m
-29° to -41°

COL
CAE, ERI

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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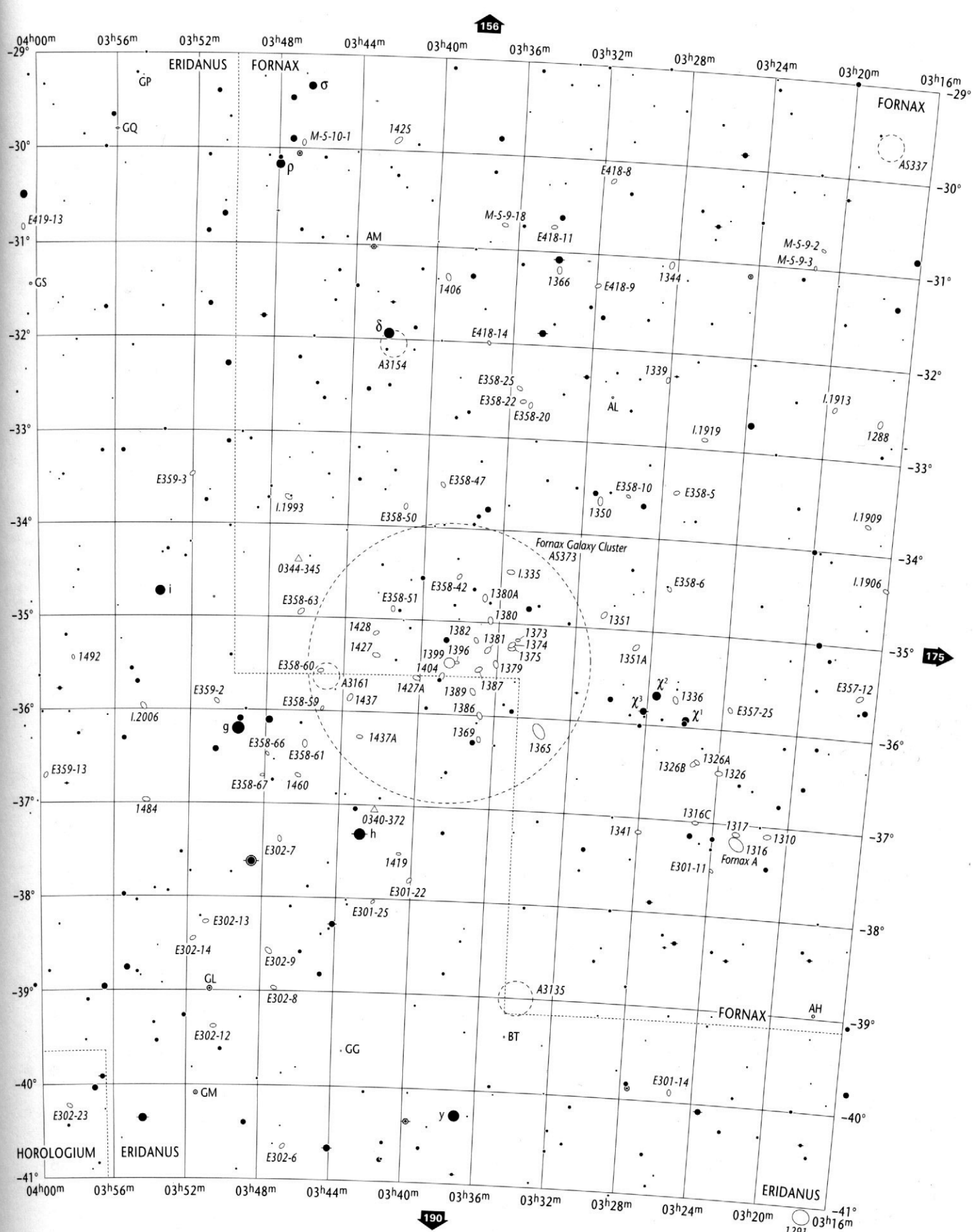


Open Star Clusters and Asterisms — to scale, <5'

Globular Star Clusters — to scale, <5'

Planetary Nebulae — >30°, 30°-10°, 10°-5°, <5°

Bright & Dark Nebulae — to scale, 10'-5', <5'

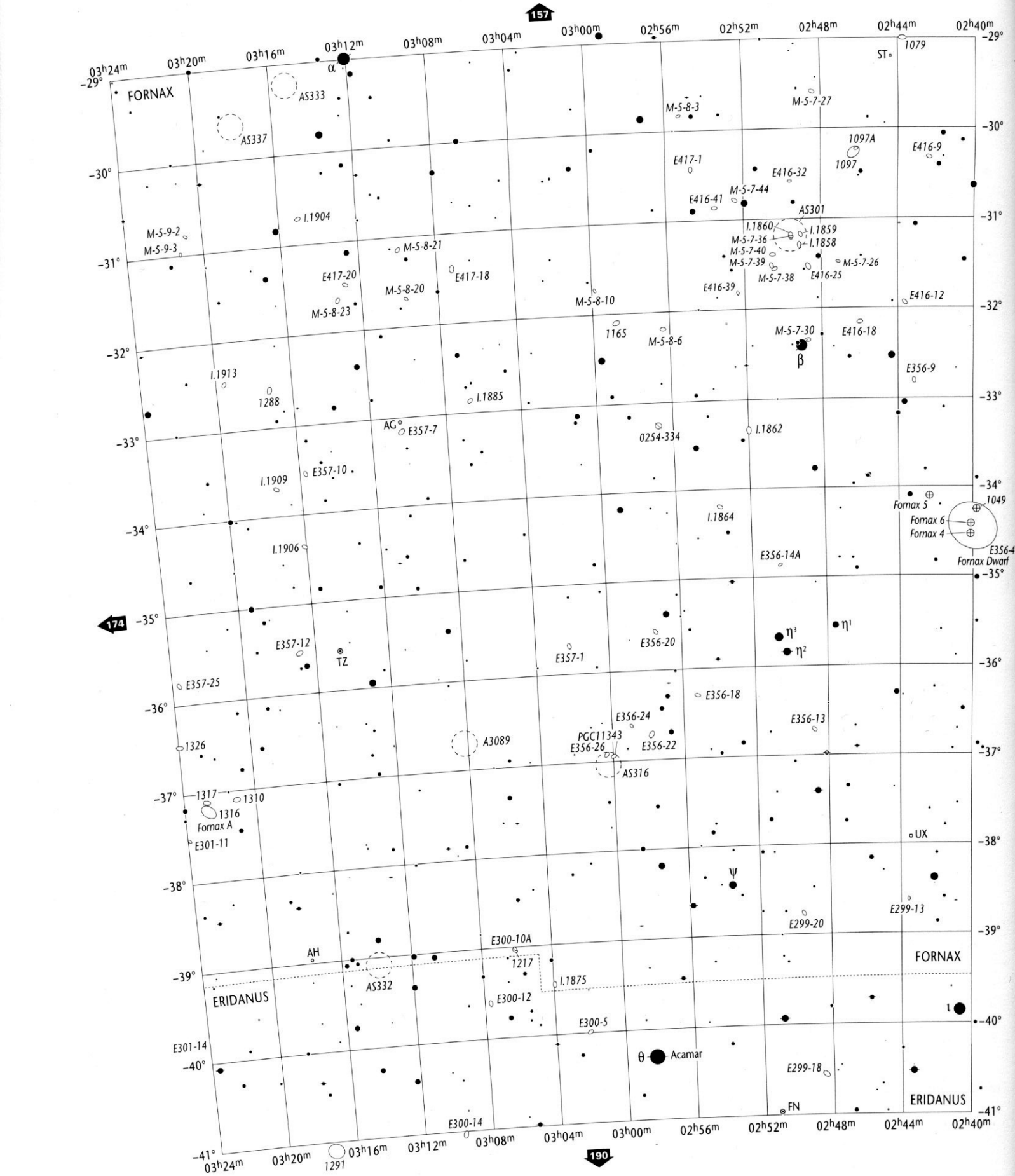
Galaxies — >5' to scale; 5'-2', 2'-1', <1' major axis

Galaxy Cluster — to scale

03h16m to 04h44m
-29° to -41°

ERI
FOR, CAE, HOR

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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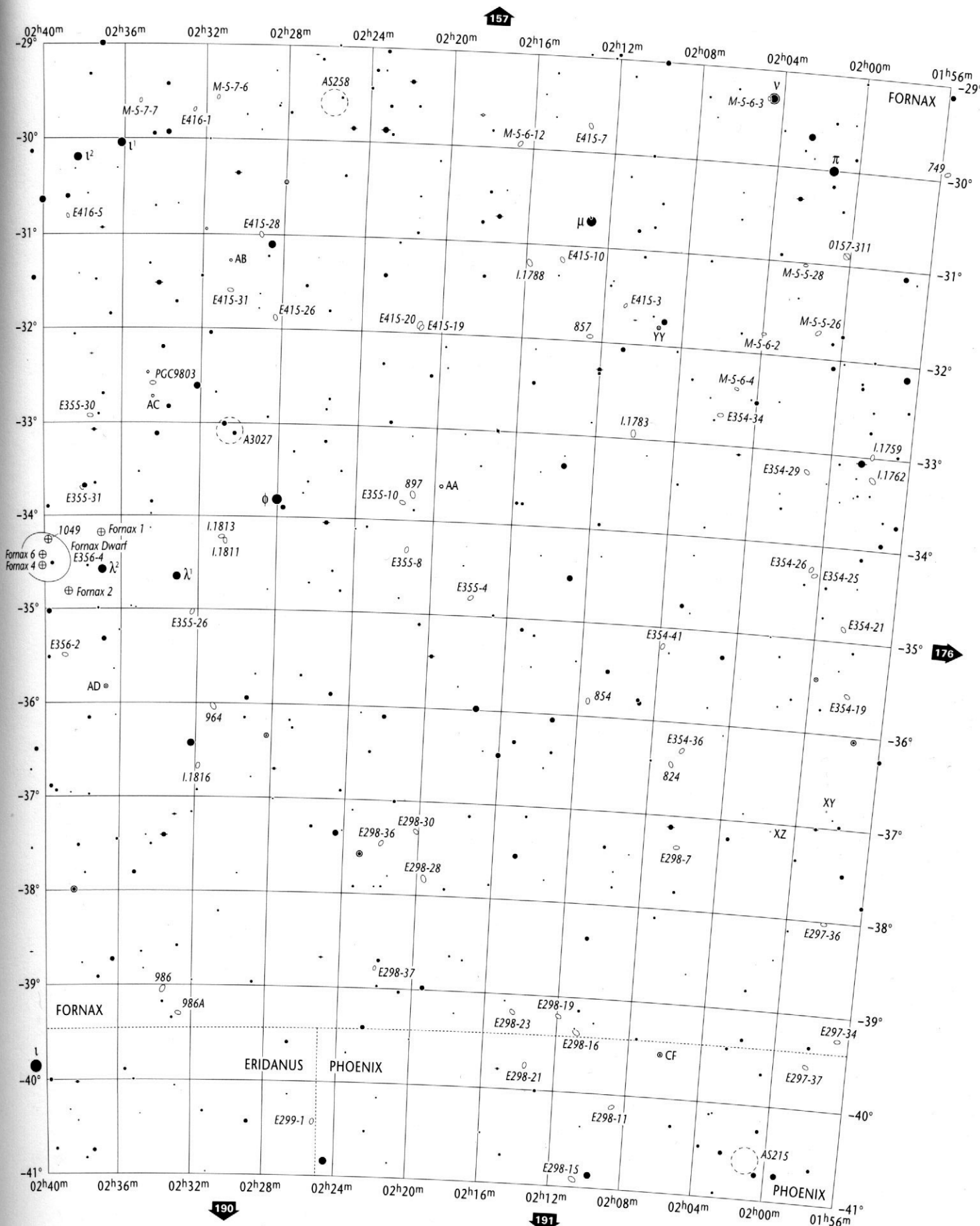
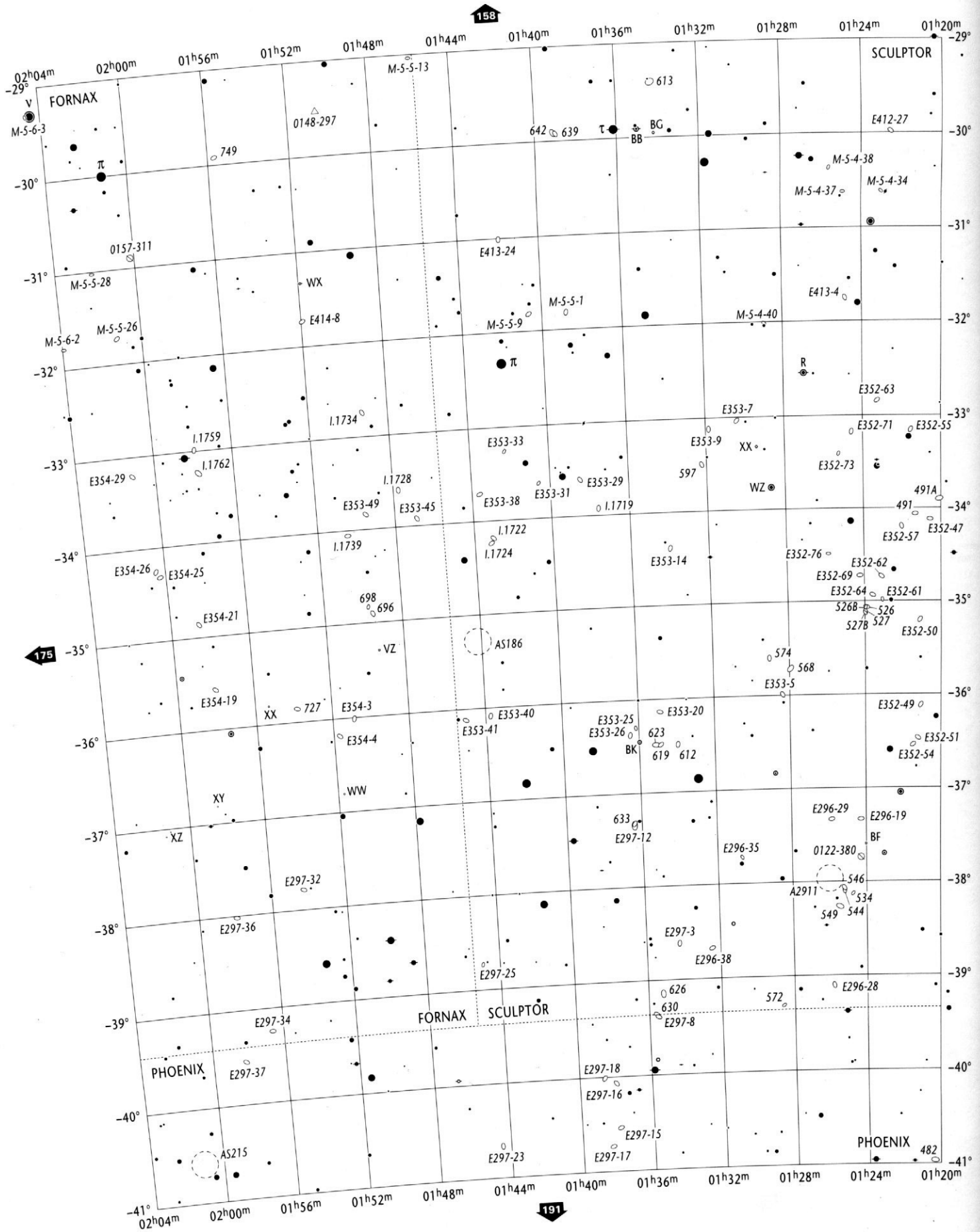


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

01h56m to 03h24m
-29° to -41°

FOR
ERI, PHE

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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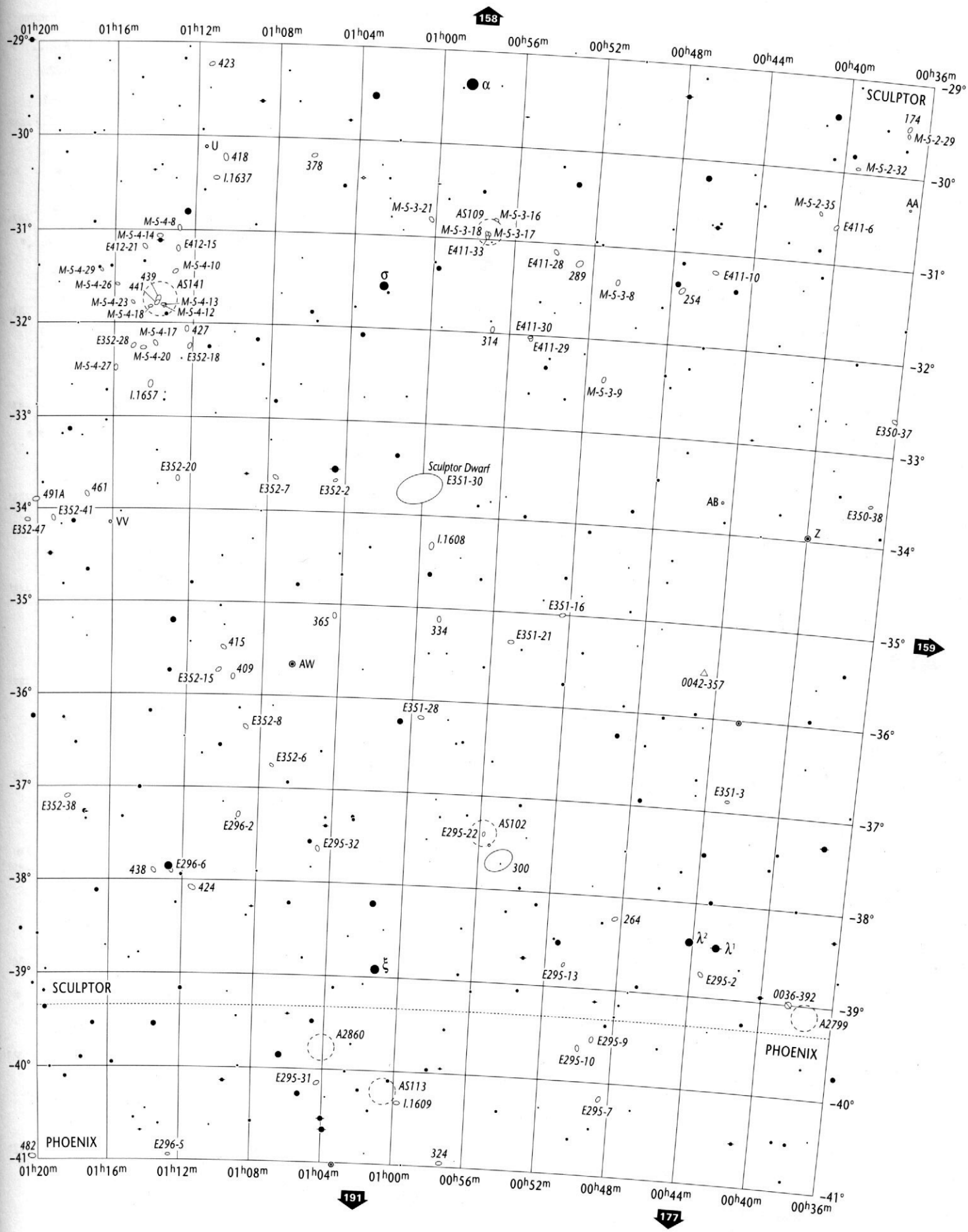
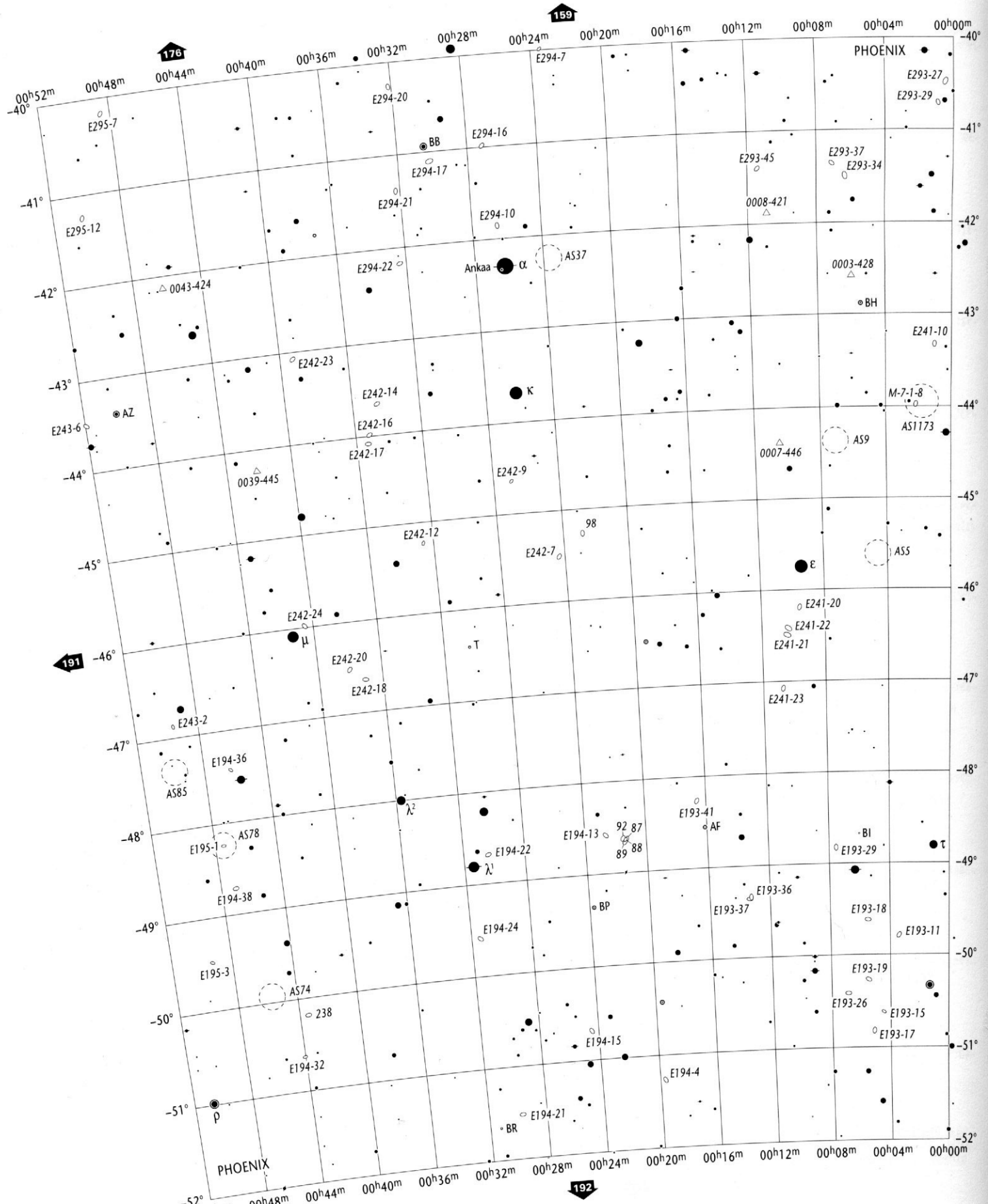


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

00h36m to 02h04m
-29° to -41°

SCL
FOR, PHE

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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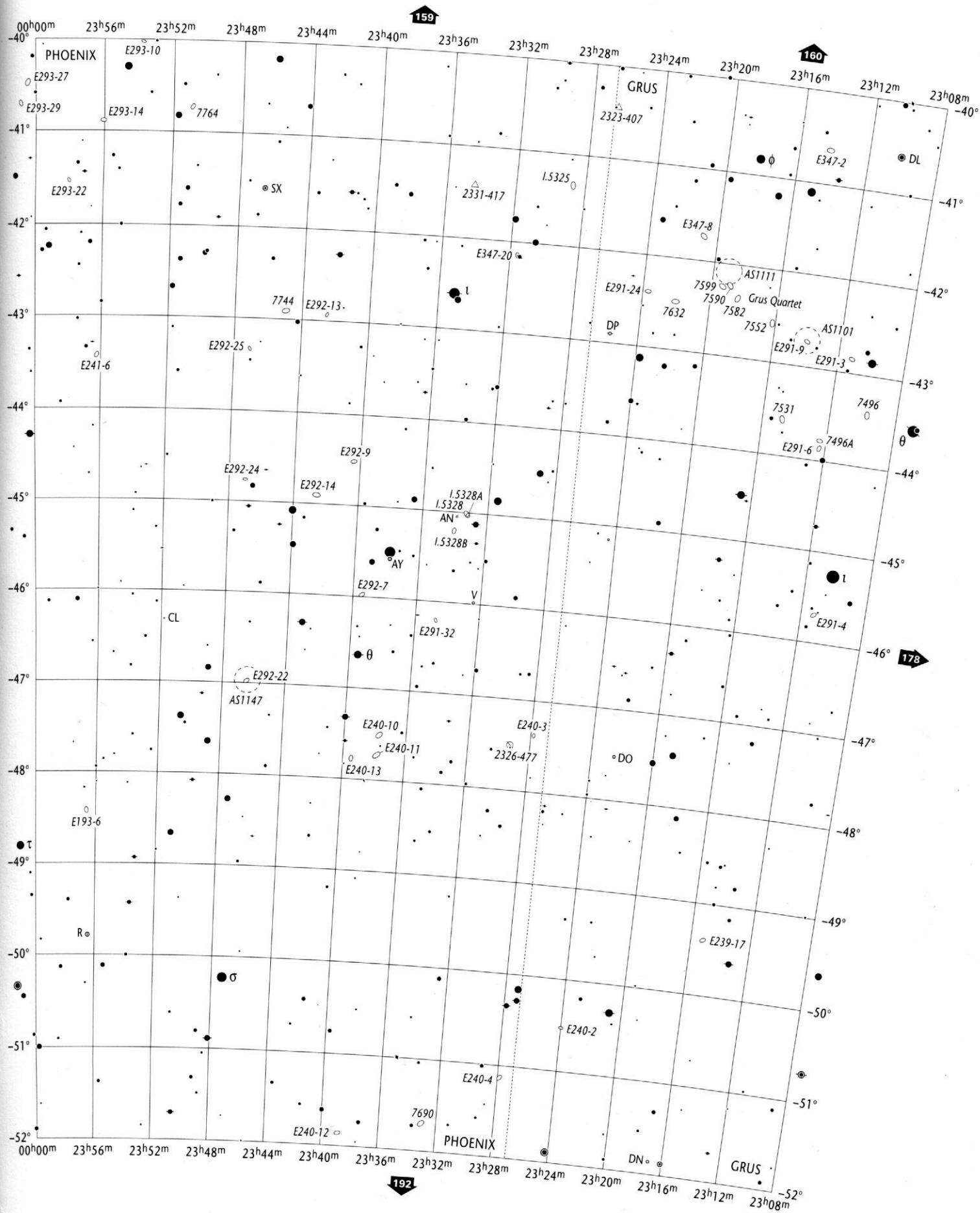
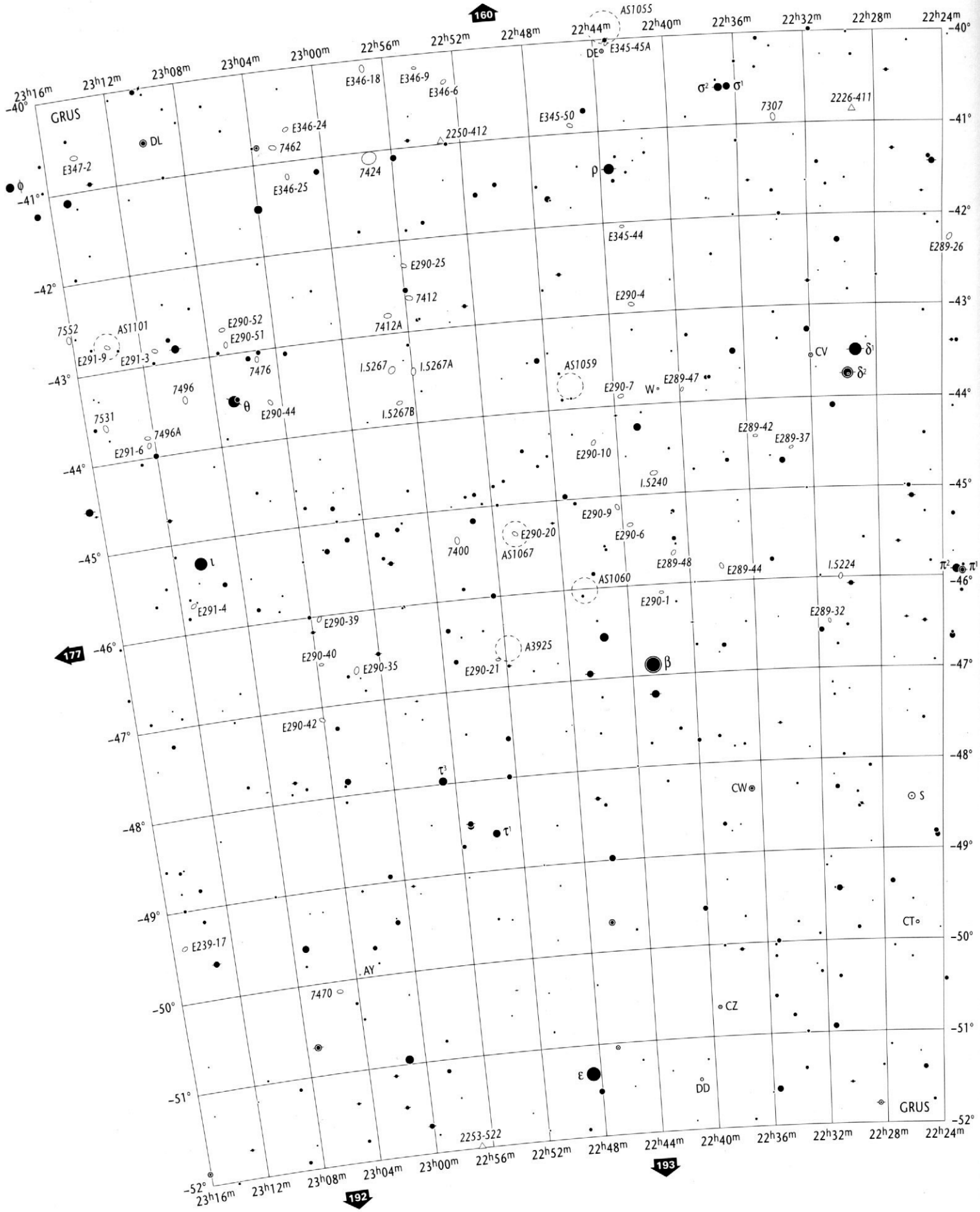


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

00h52m to 23h08m
-40° to -52°

PHE
GRU

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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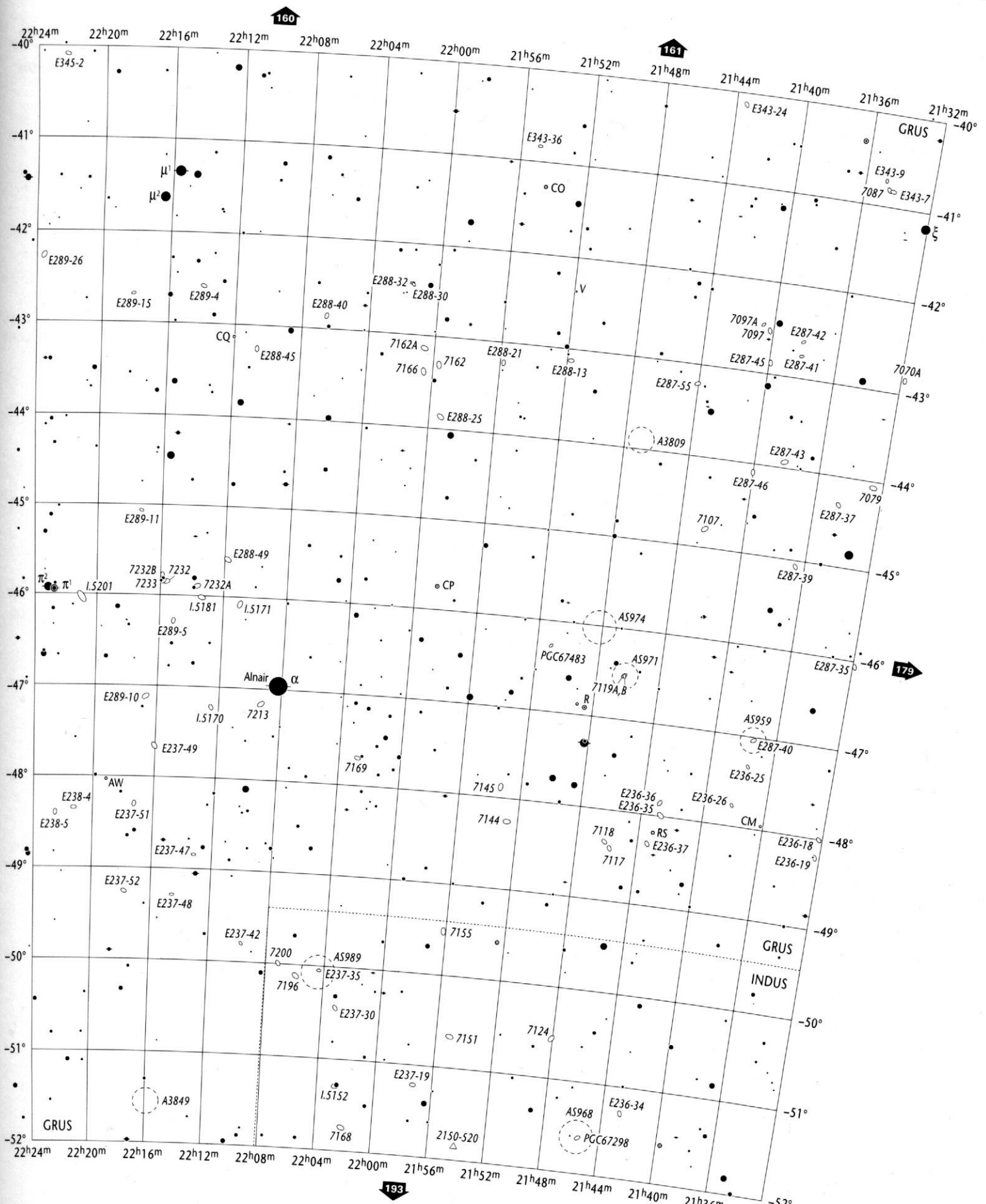
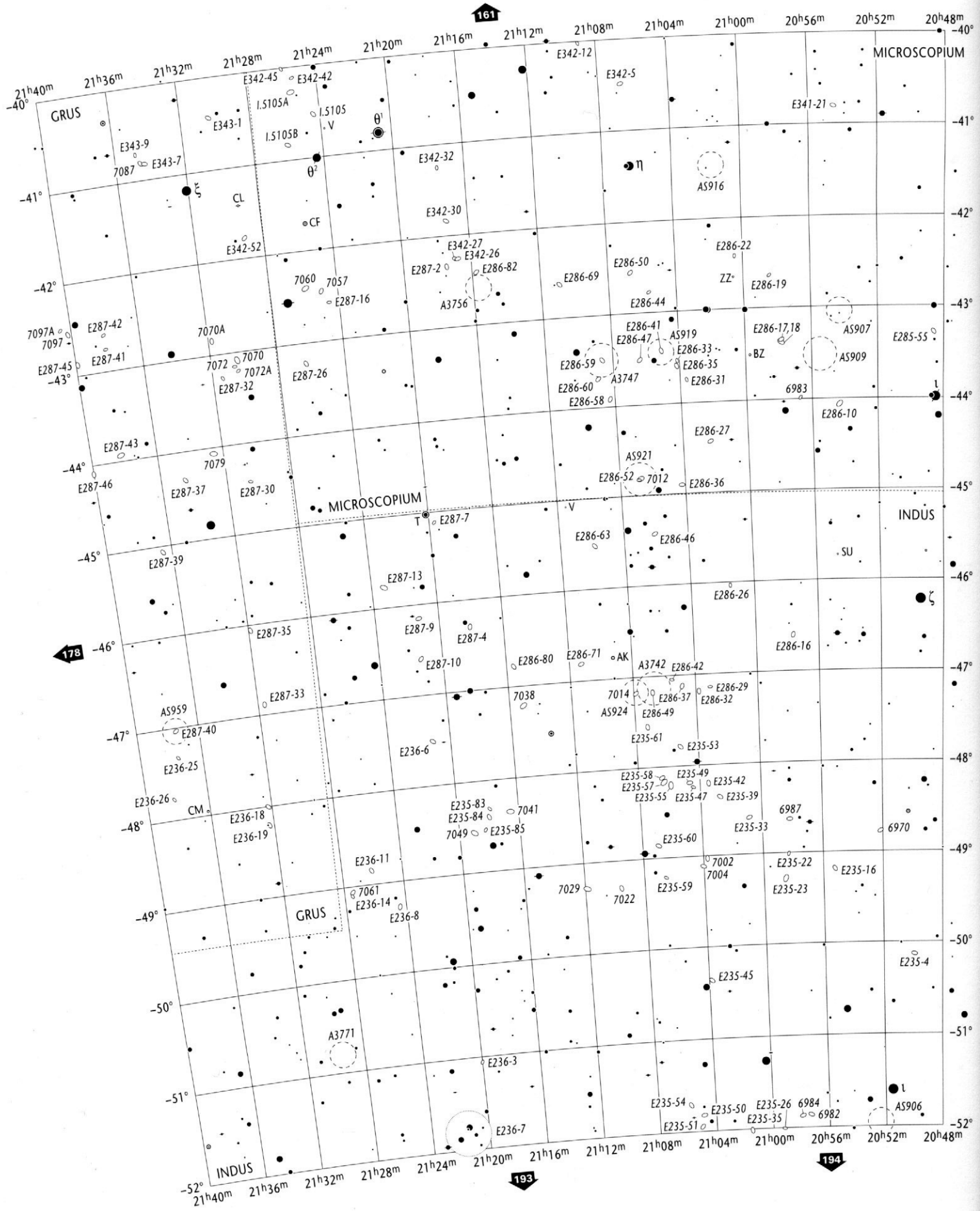


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	21h32m to 23h16m -40° to -52°	GRU IND
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60°

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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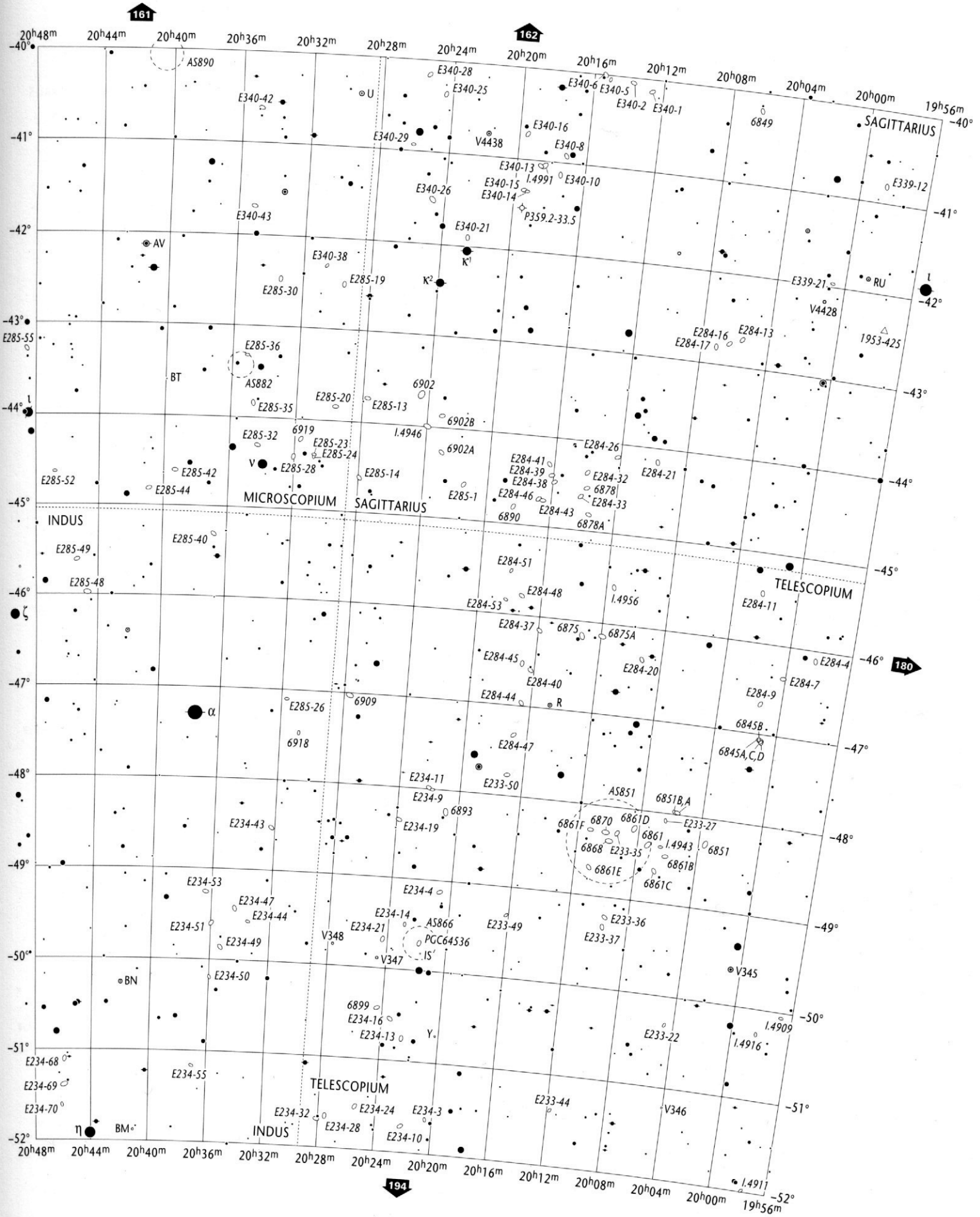
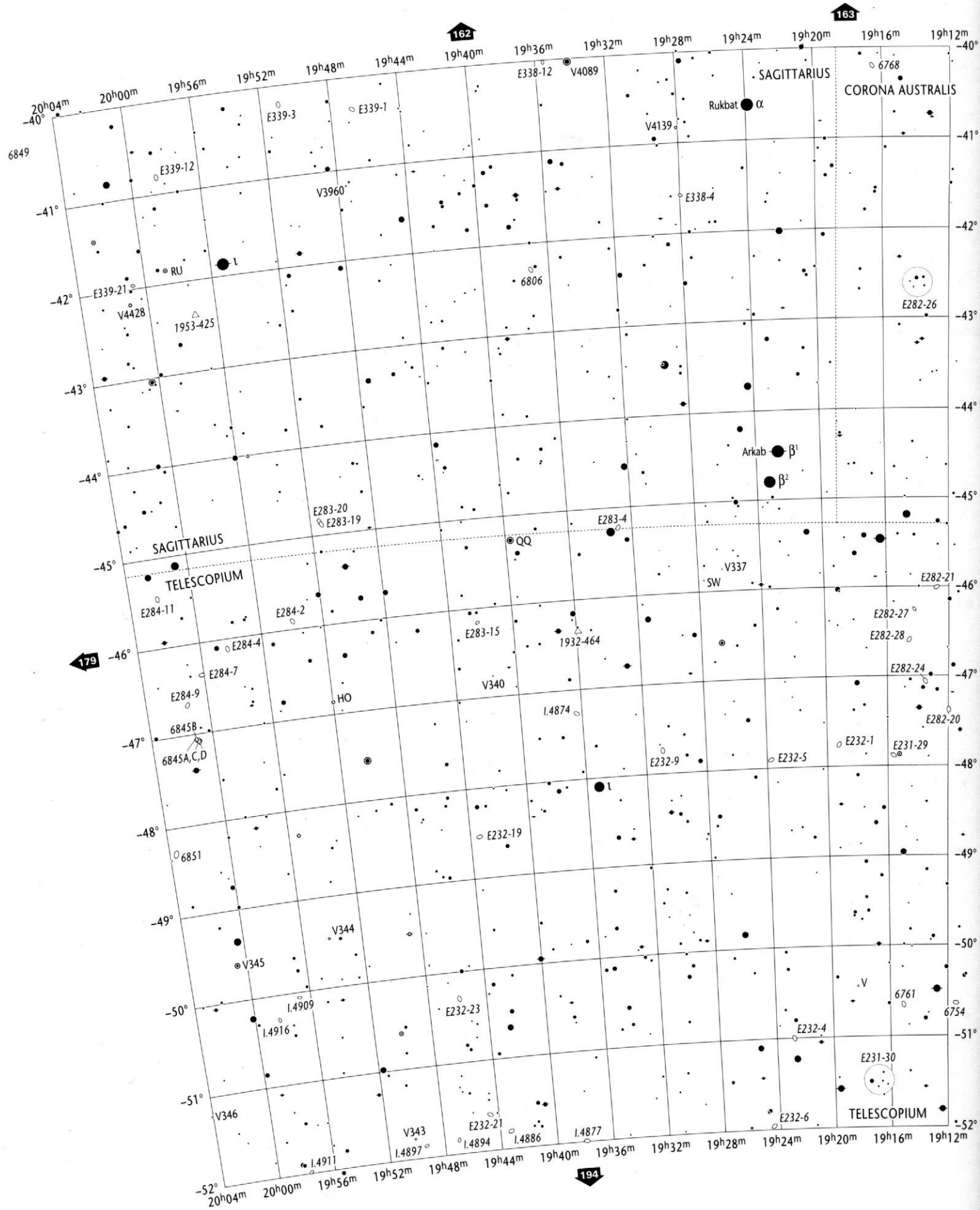


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

19h56m to 21h40m
-40° to -52°

IND
MIC, TEL, SGR, GRU

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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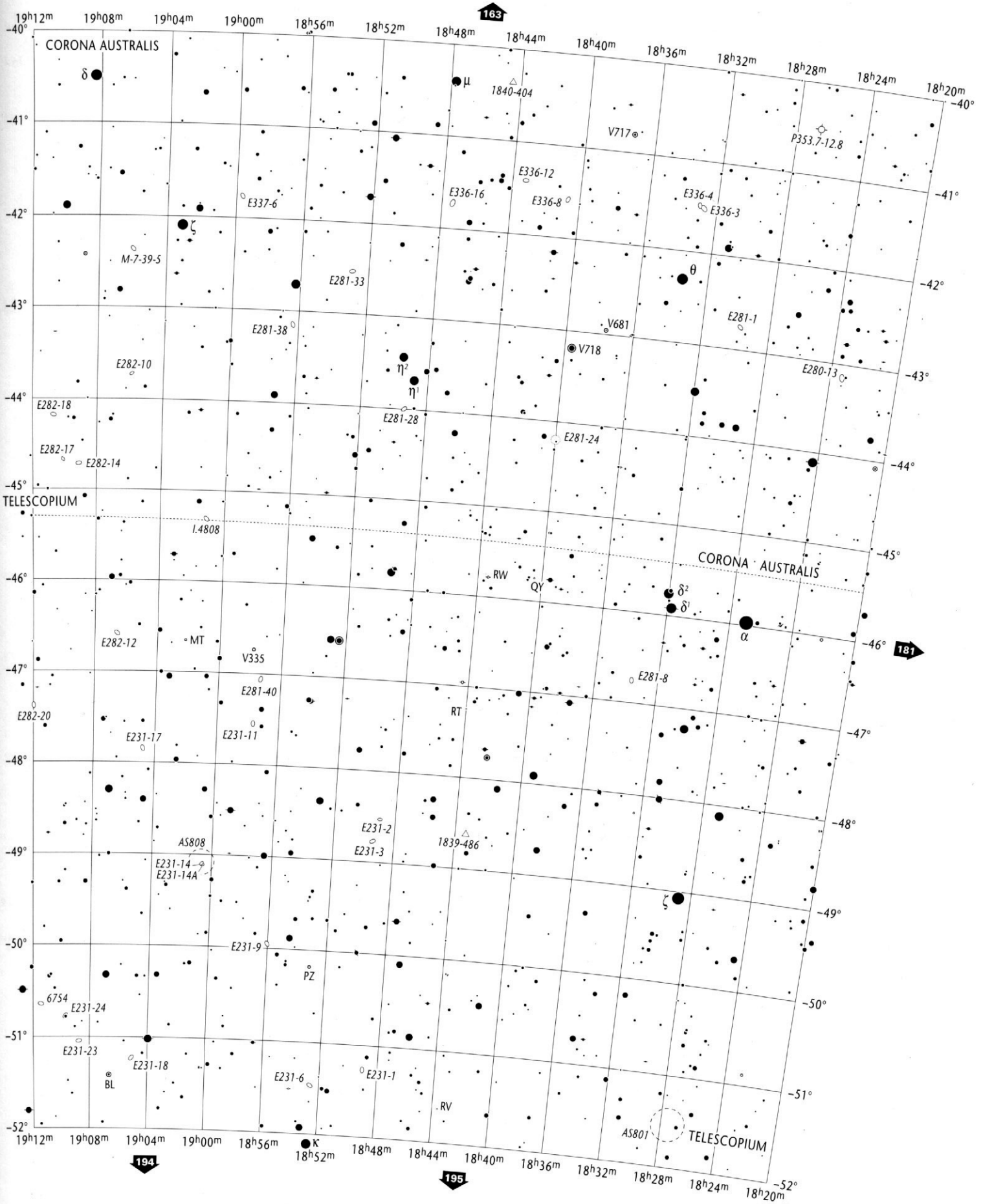
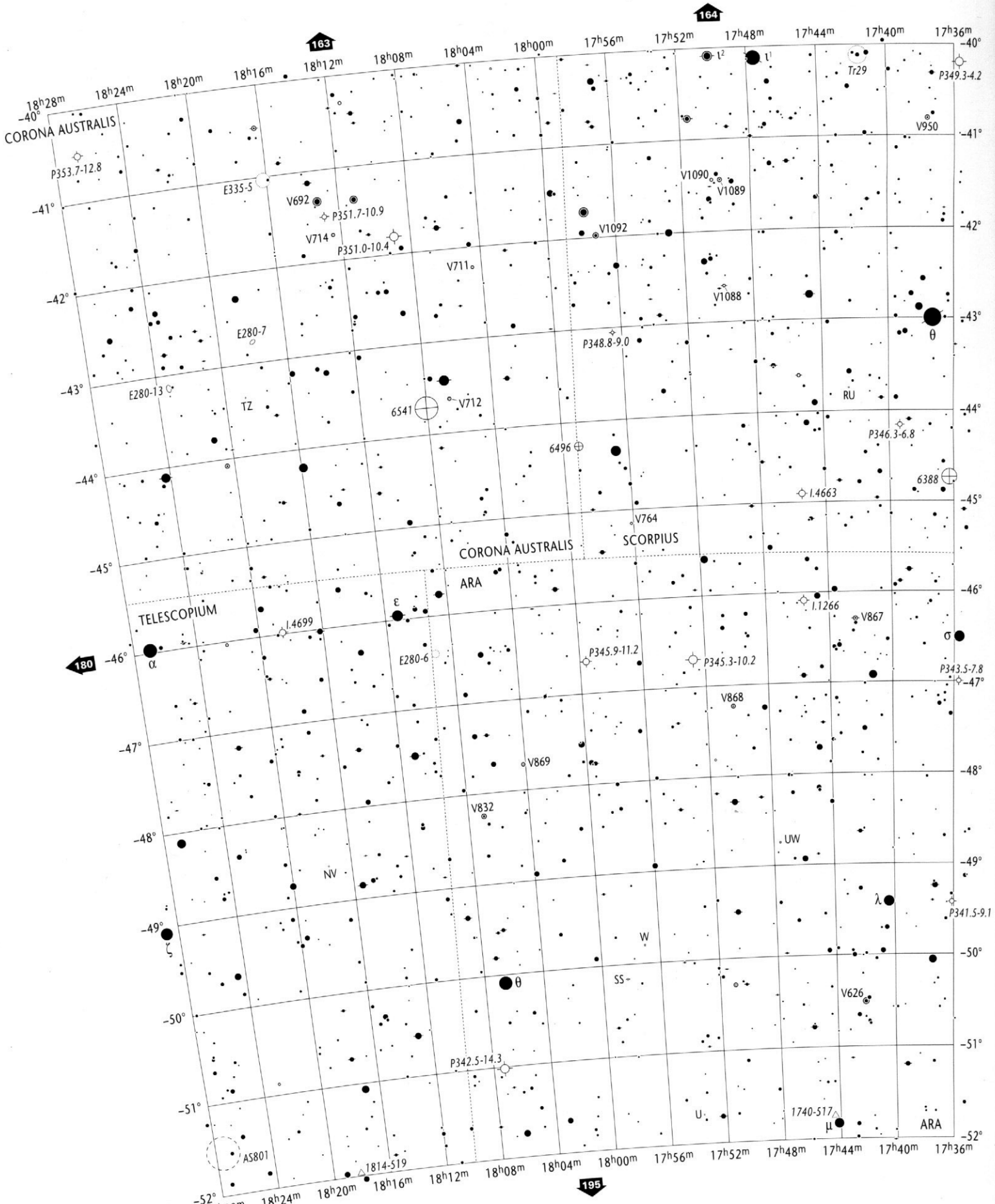


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

18h20m to 20h04m
-40° to -52°

TEL
CRA, SGR

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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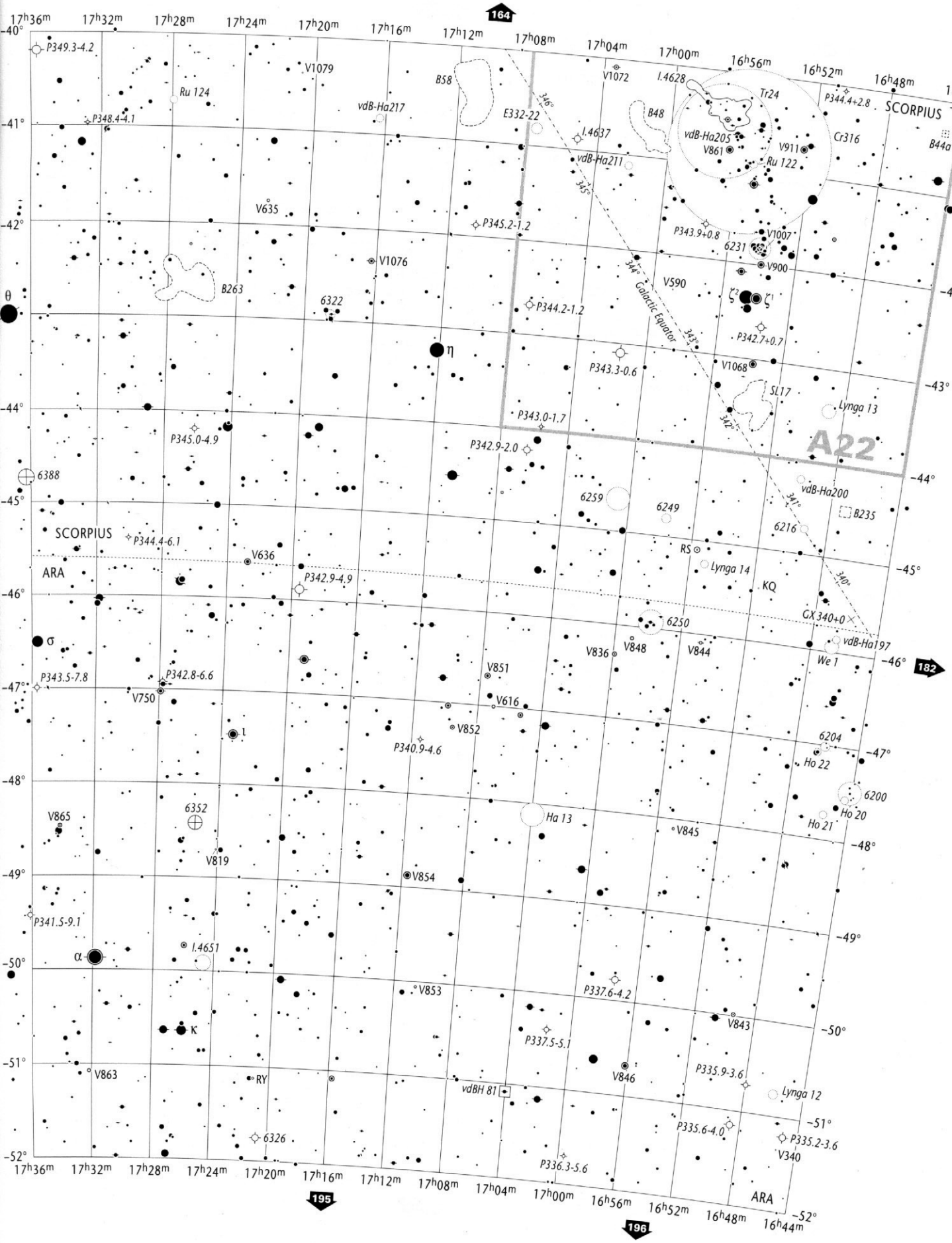
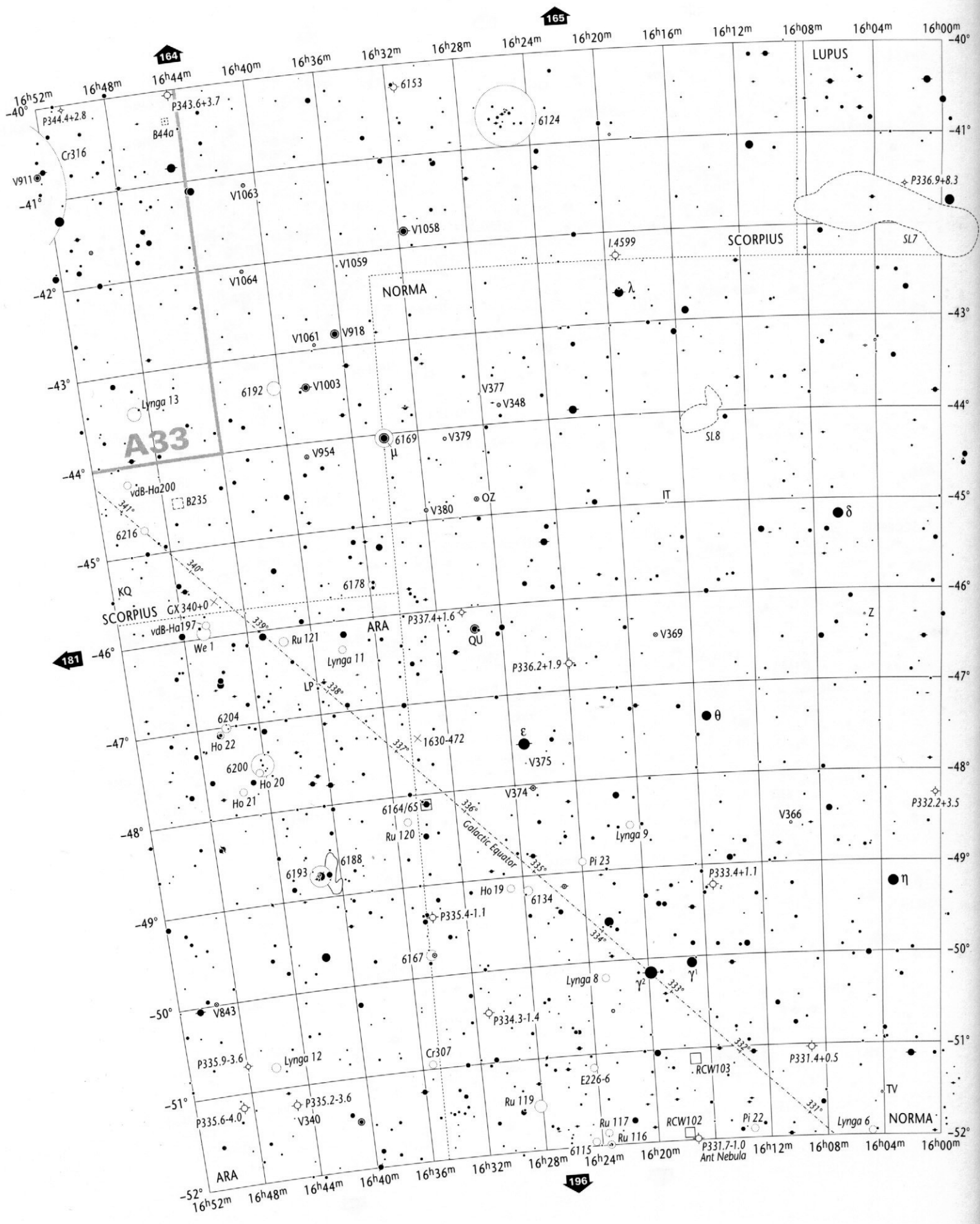


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30', 30'-10', 10'-5', < 5'	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

16h44m to 18h28m
-40° to -52°

ARA
SCO, CRA, TEL

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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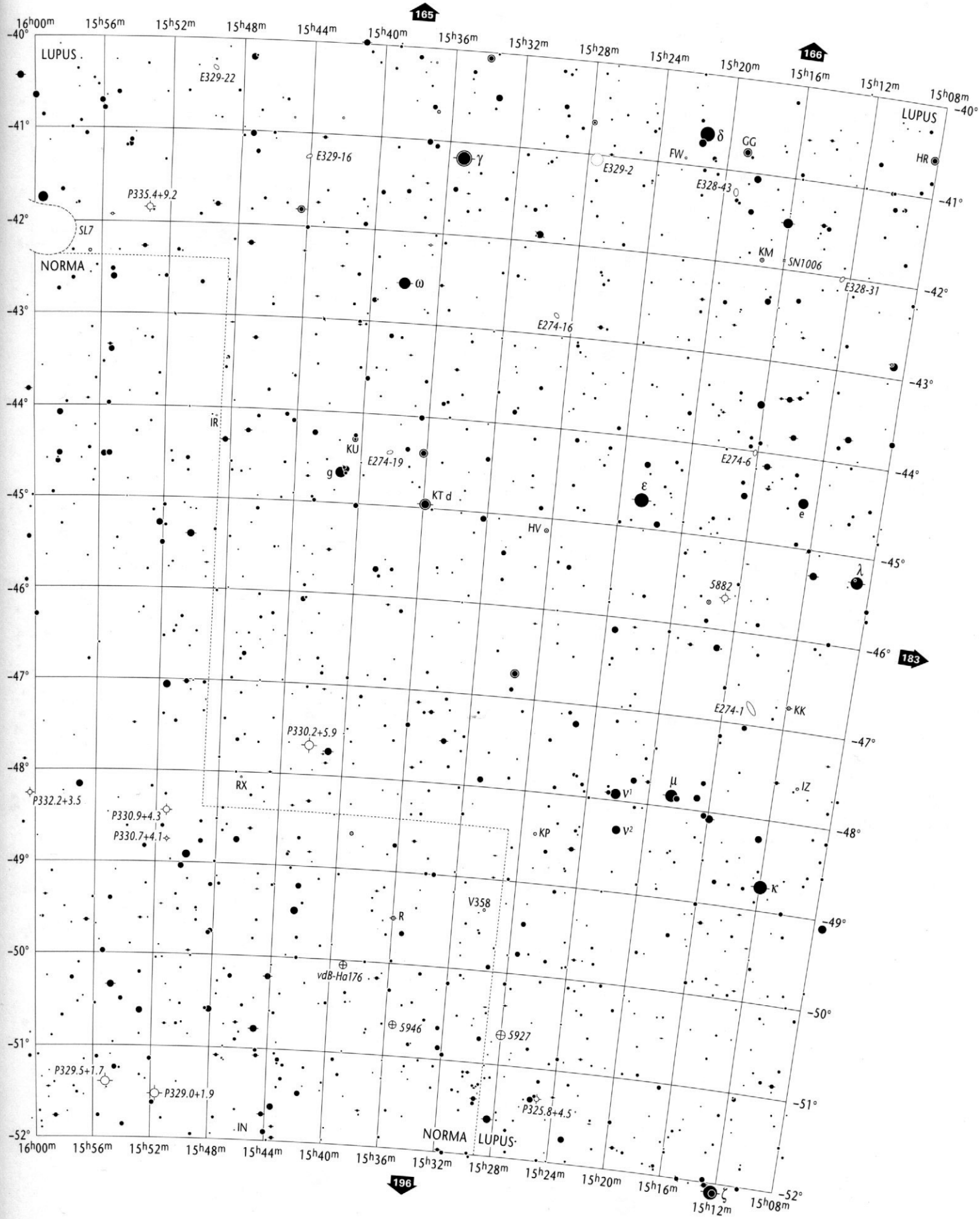
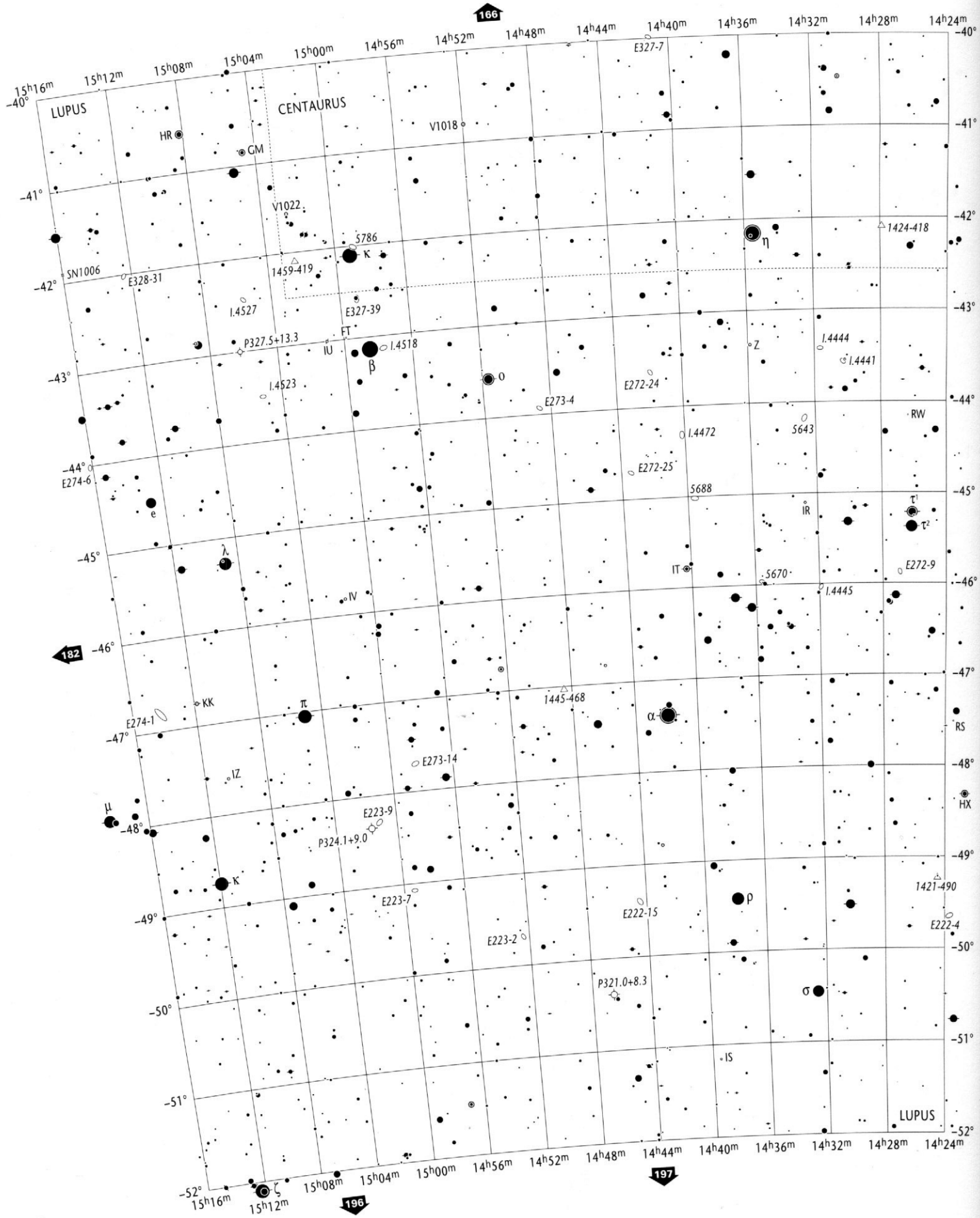


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

15h08m to 16h52m
-40° to -52°

NOR
LUP, SCO, ARA

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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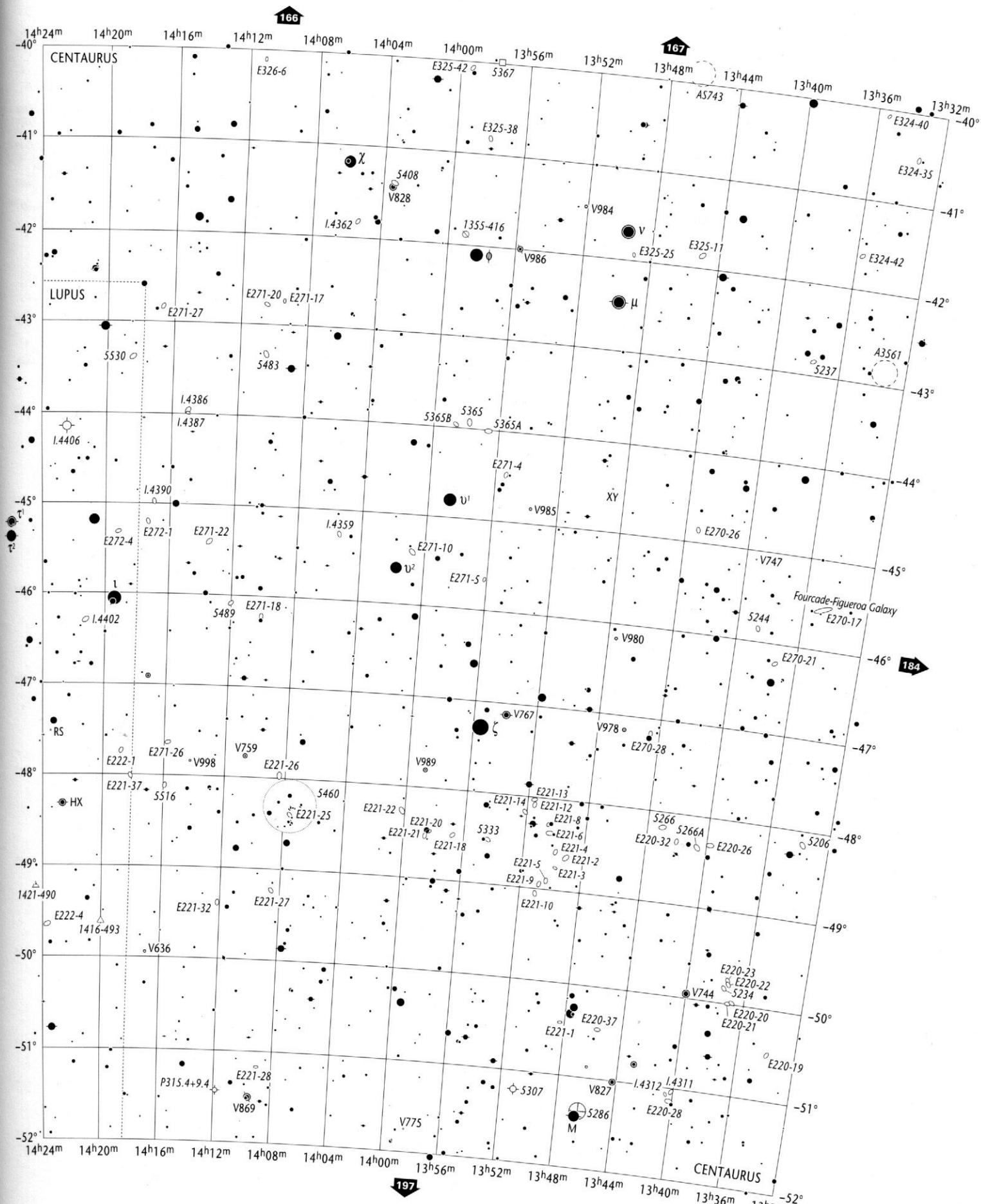
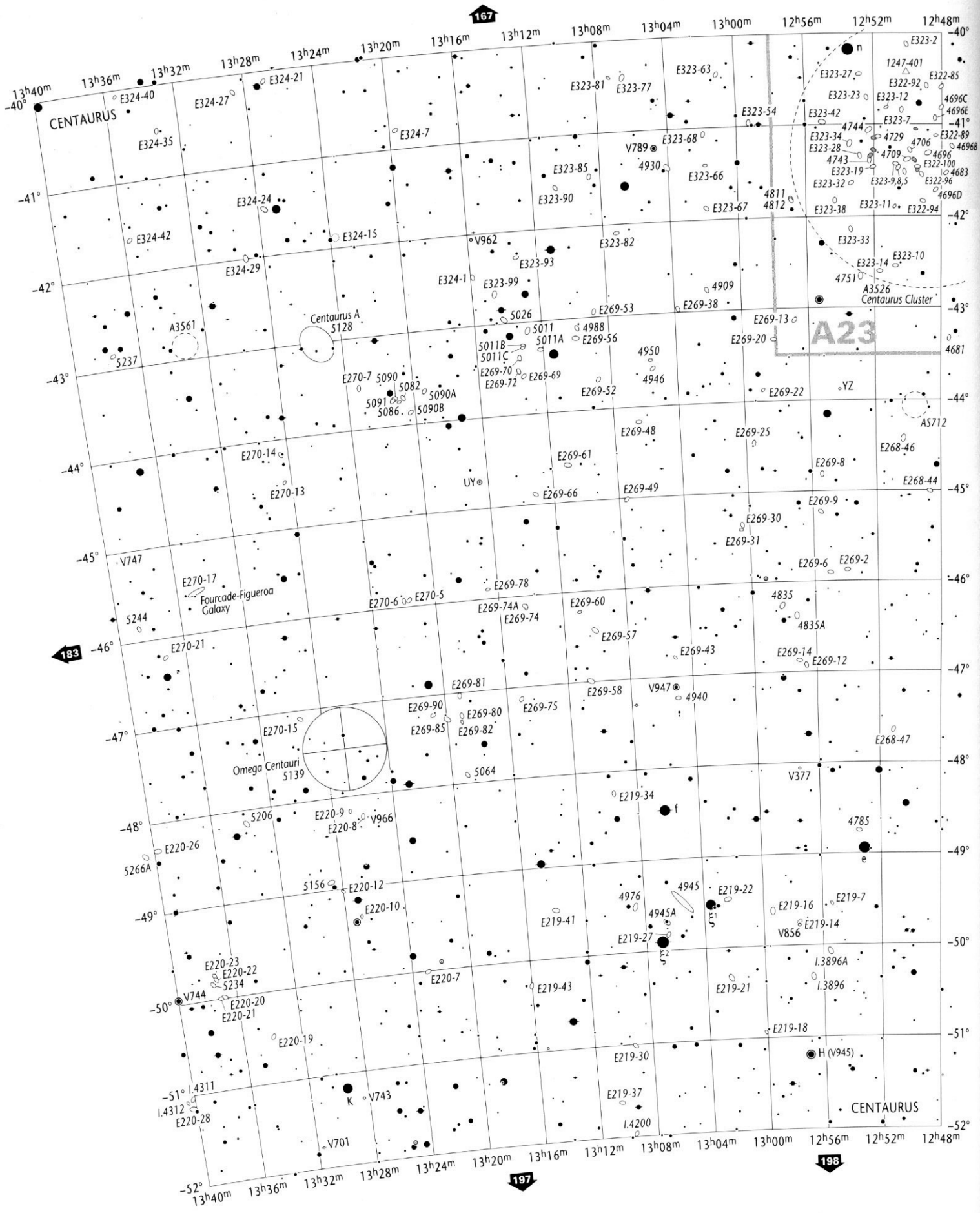


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	13^h32^m to 15^h16^m	CEN
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	$-40°$ to $-52°$	LUP

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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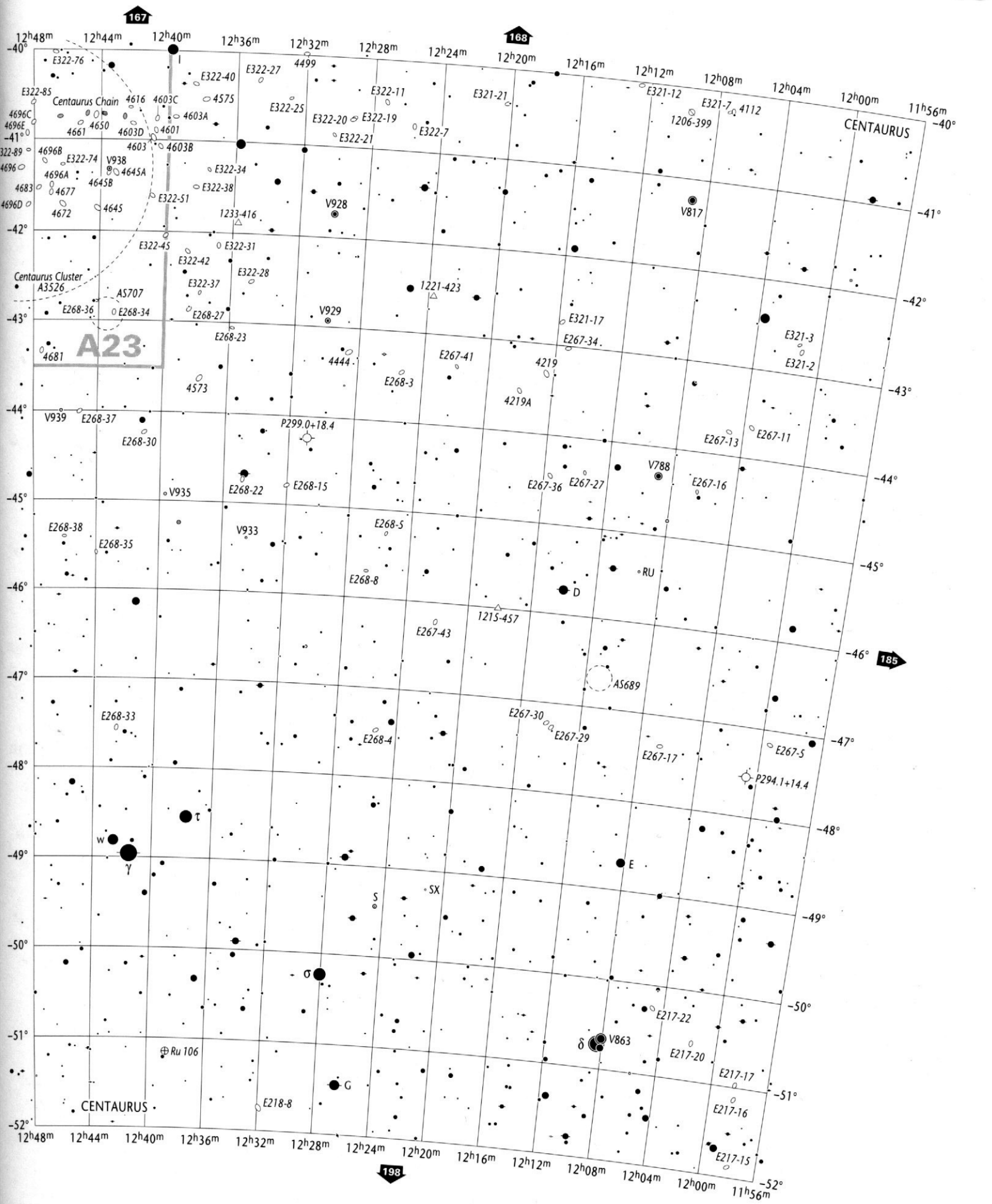
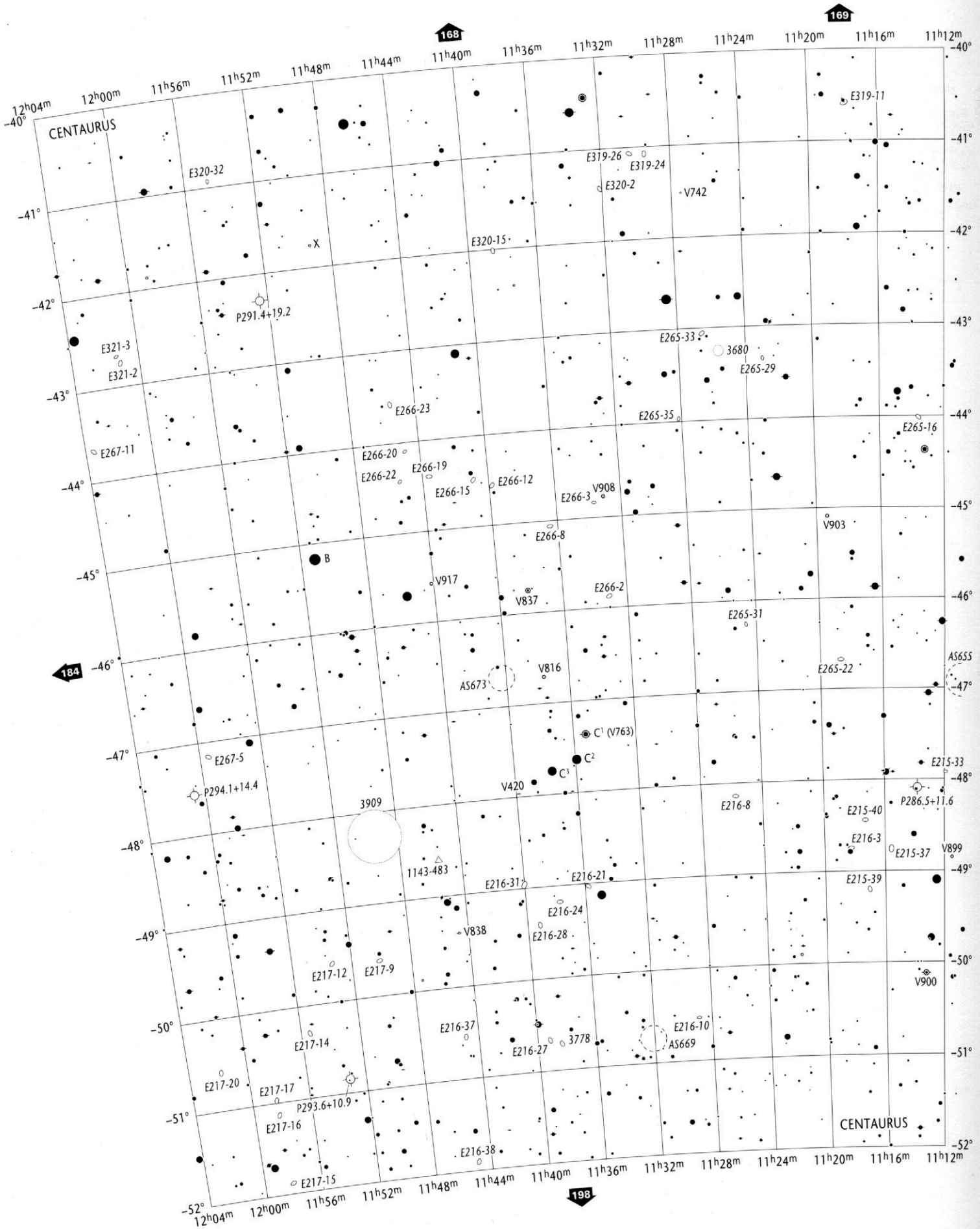


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale	**11h56m to 13h40m -40° to -52°**	**CEN**

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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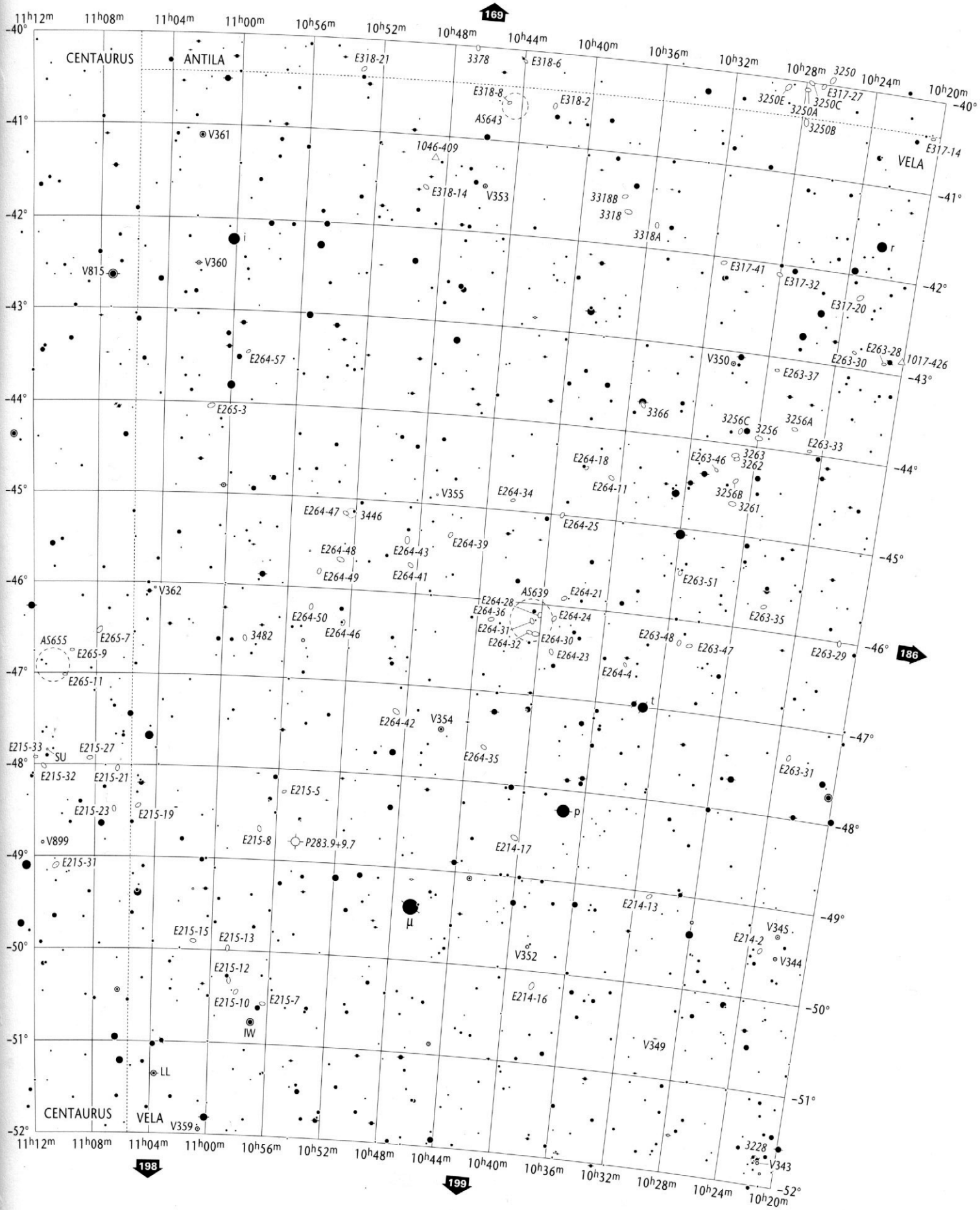
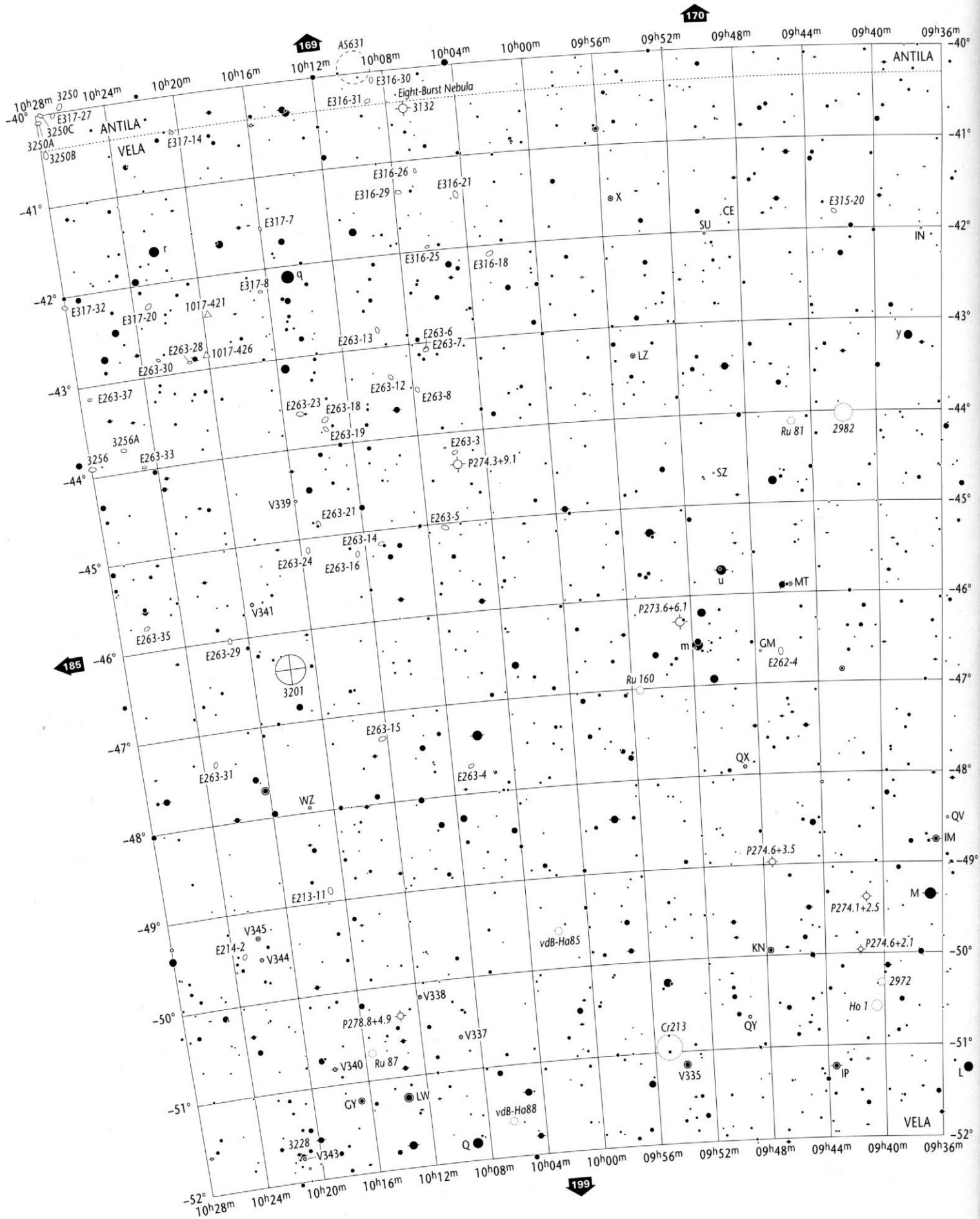


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

10h20m to 12h04m
-40° to -52°

CEN
VEL, ANT

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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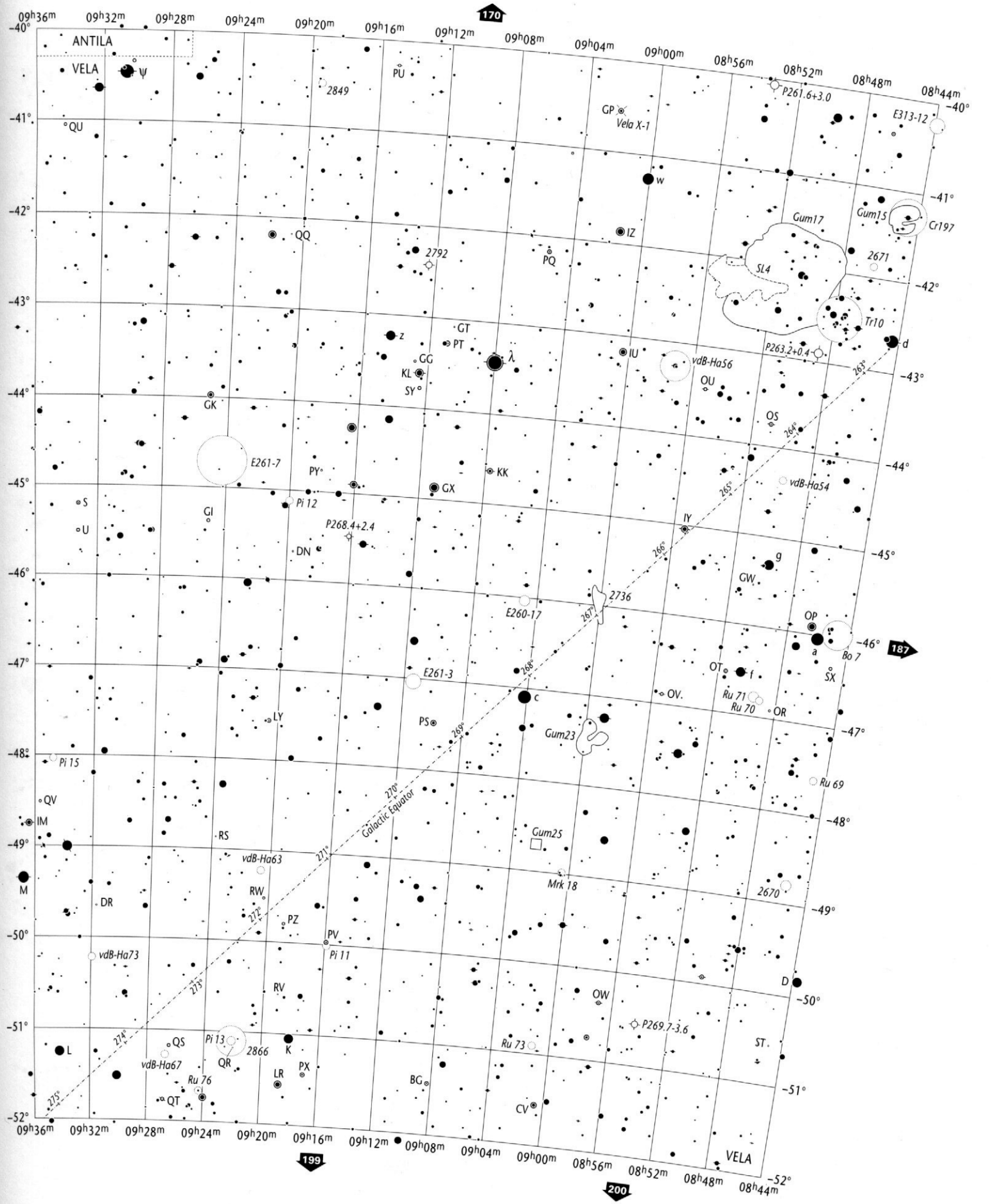
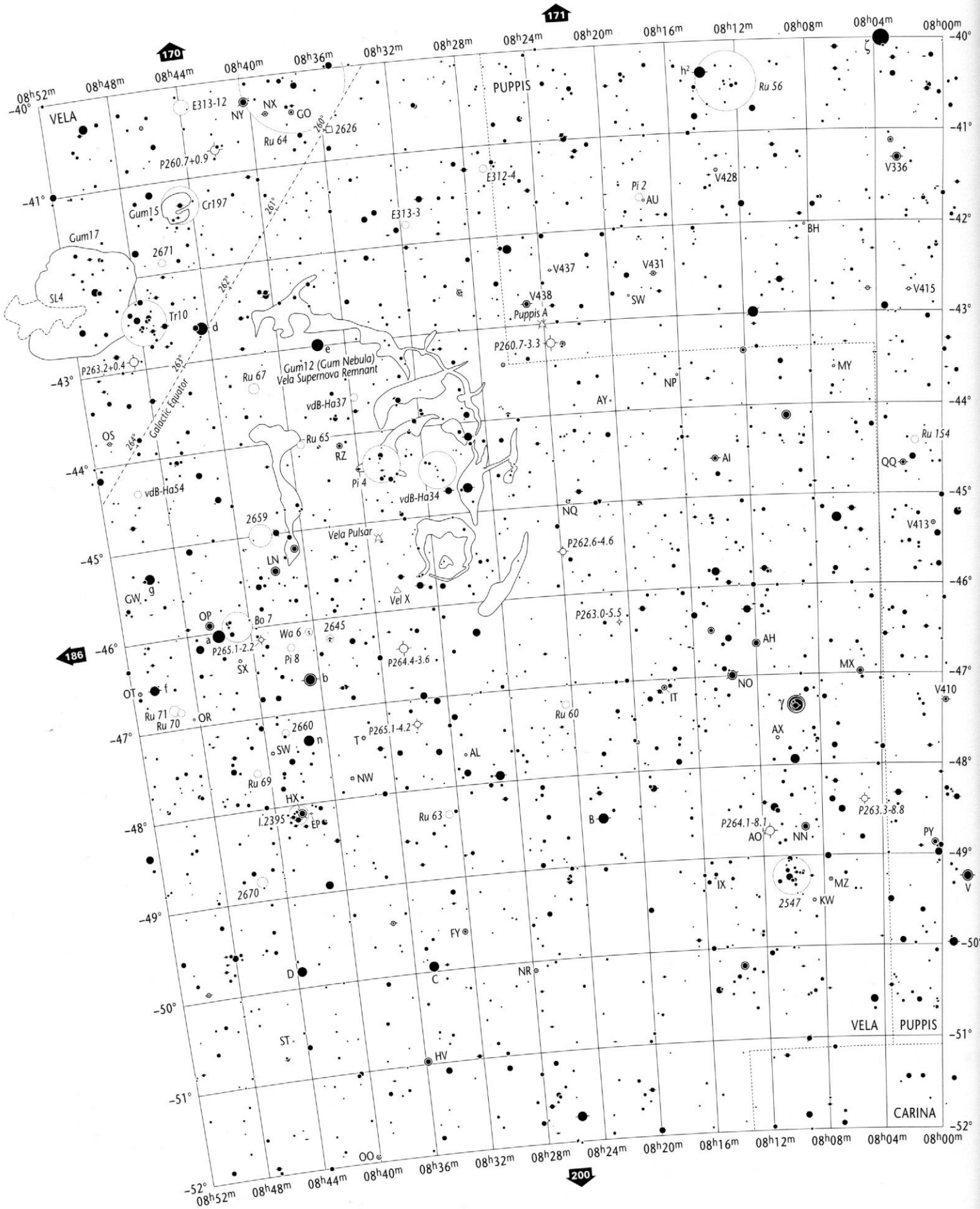


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	08^h44^m to 10^h28^m $-40°$ to $-52°$	VEL ANT
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



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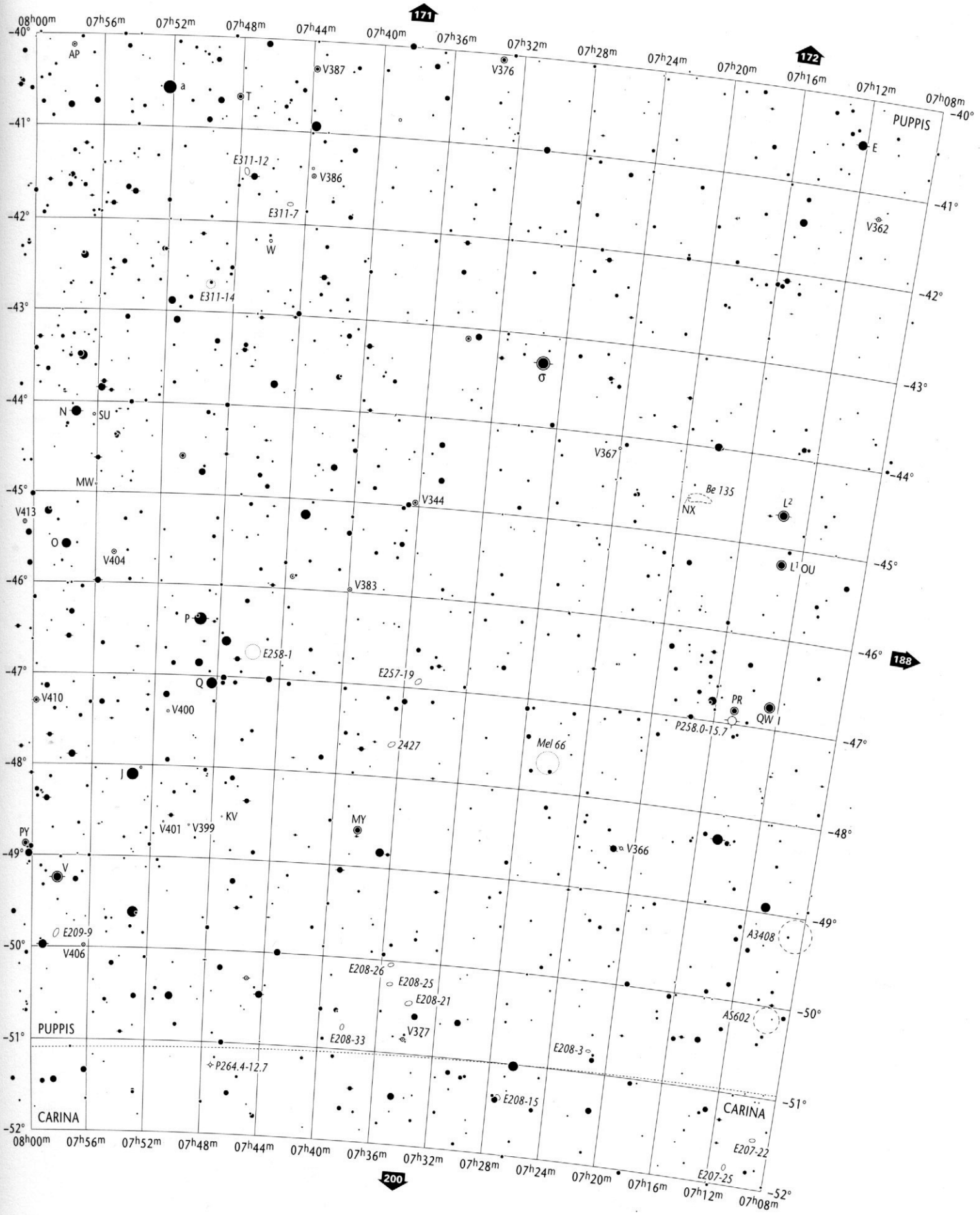
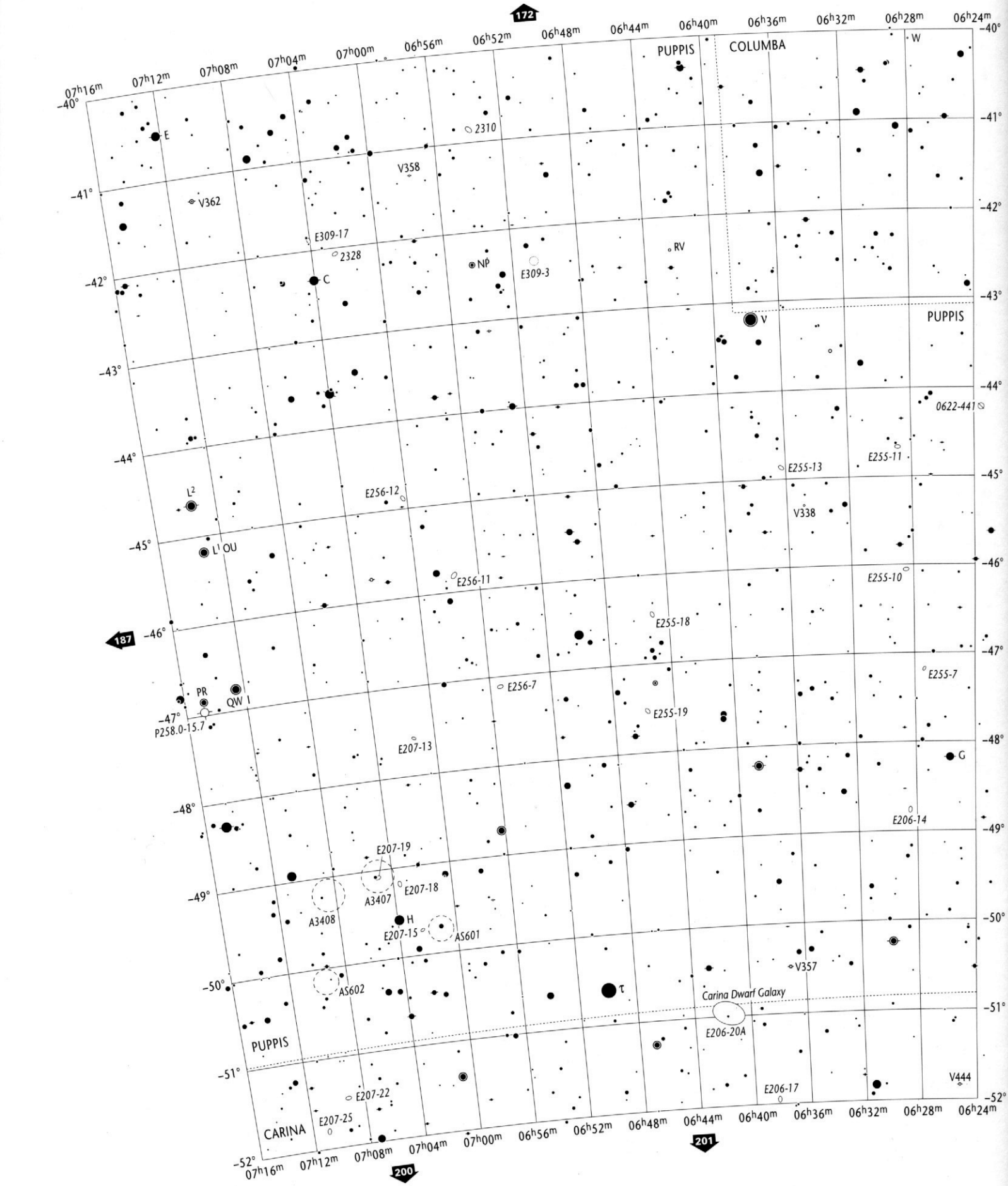


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

07h08m to 08h52m
-40° to -52°

PUP
VEL, CAR

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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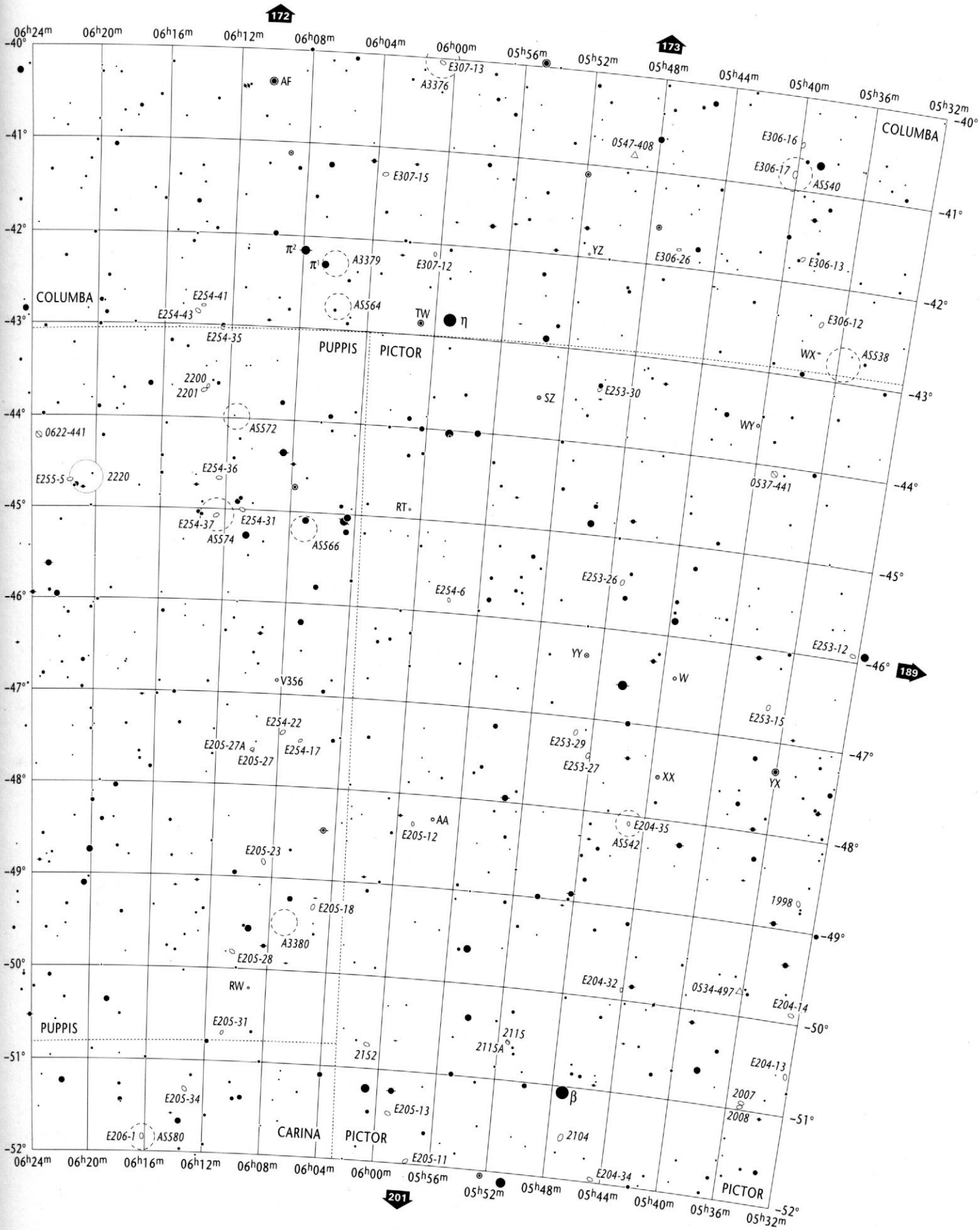
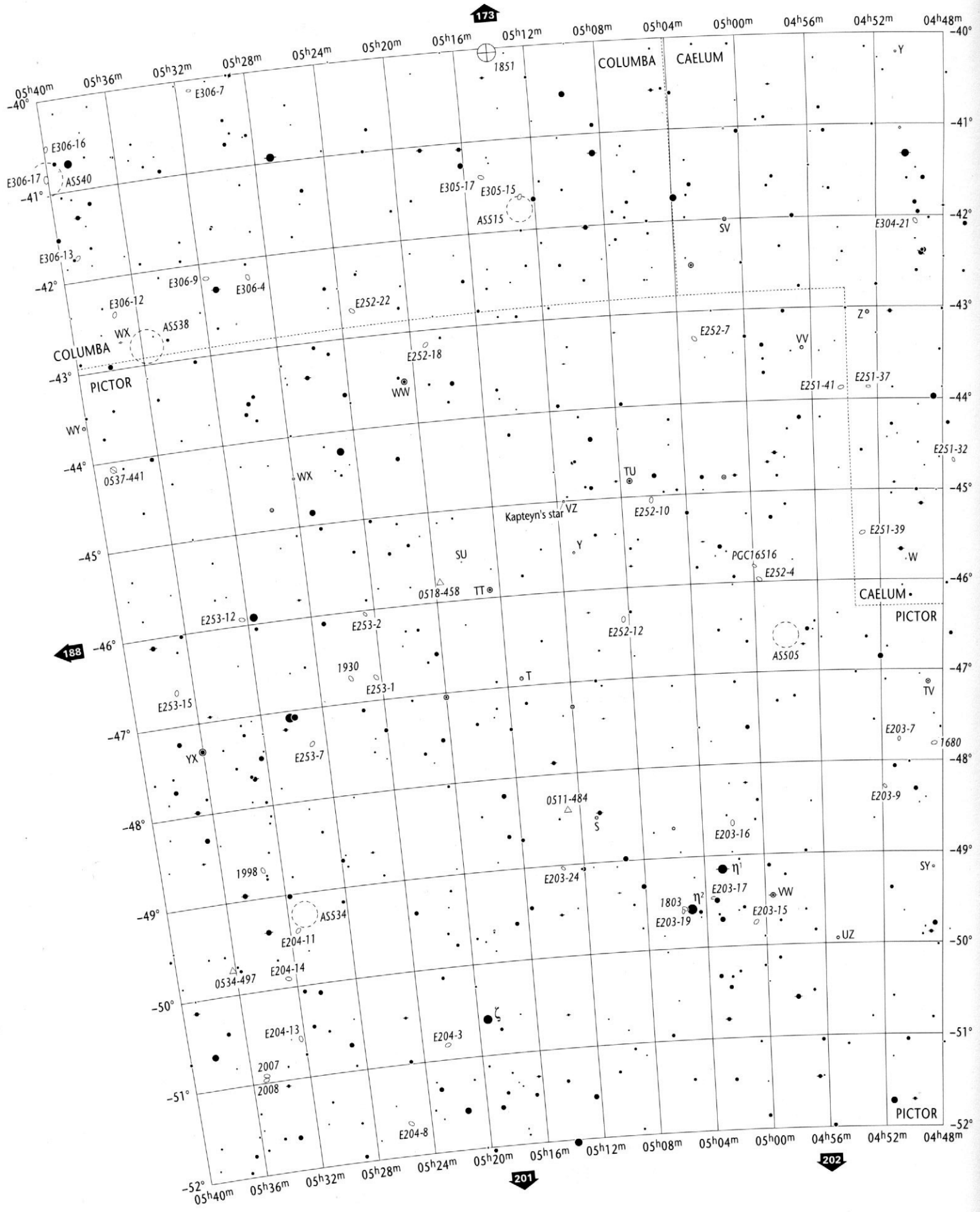


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

05h32m to 07h16m
-40° to -52°

PUP
PIC, COL, CAR

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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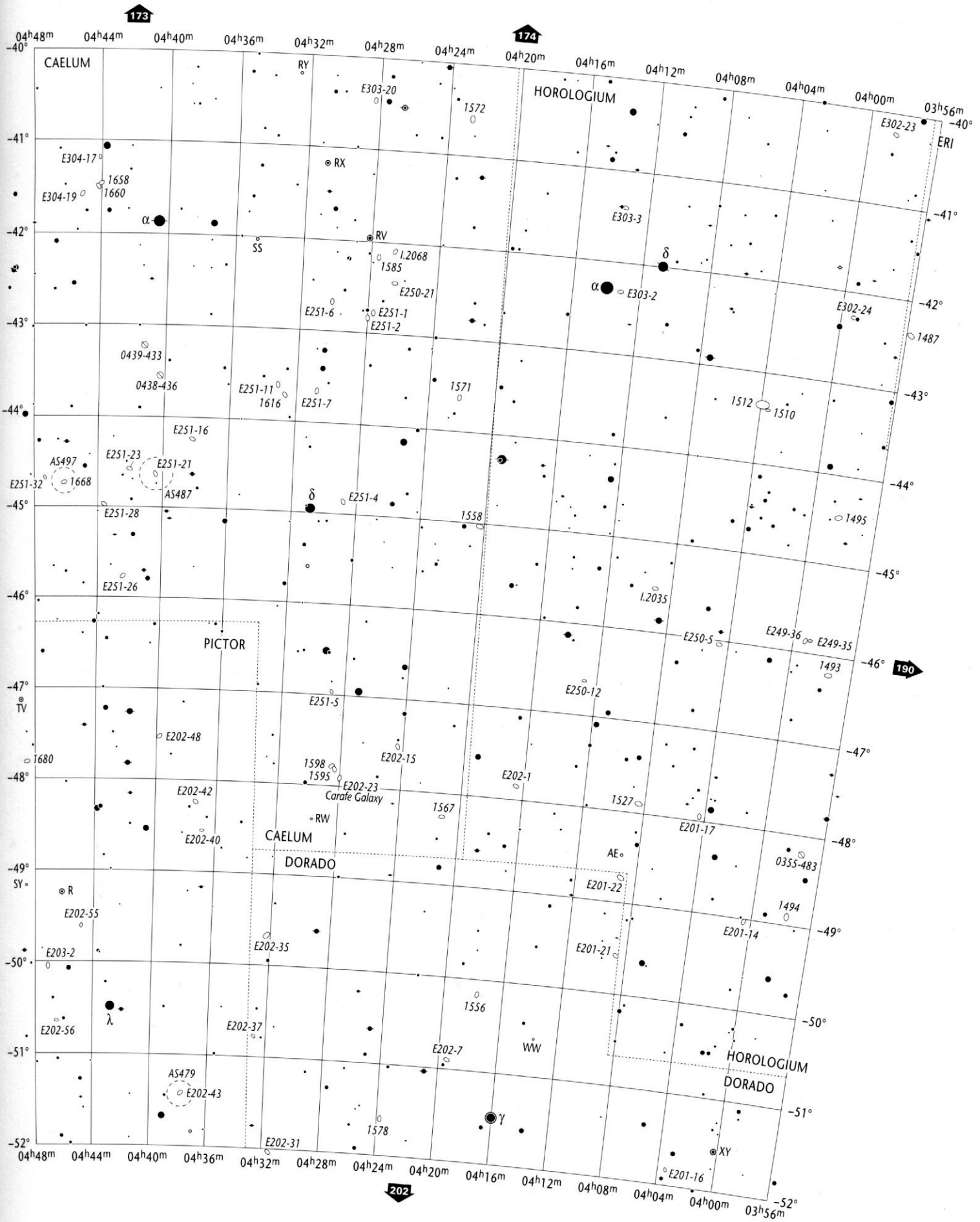
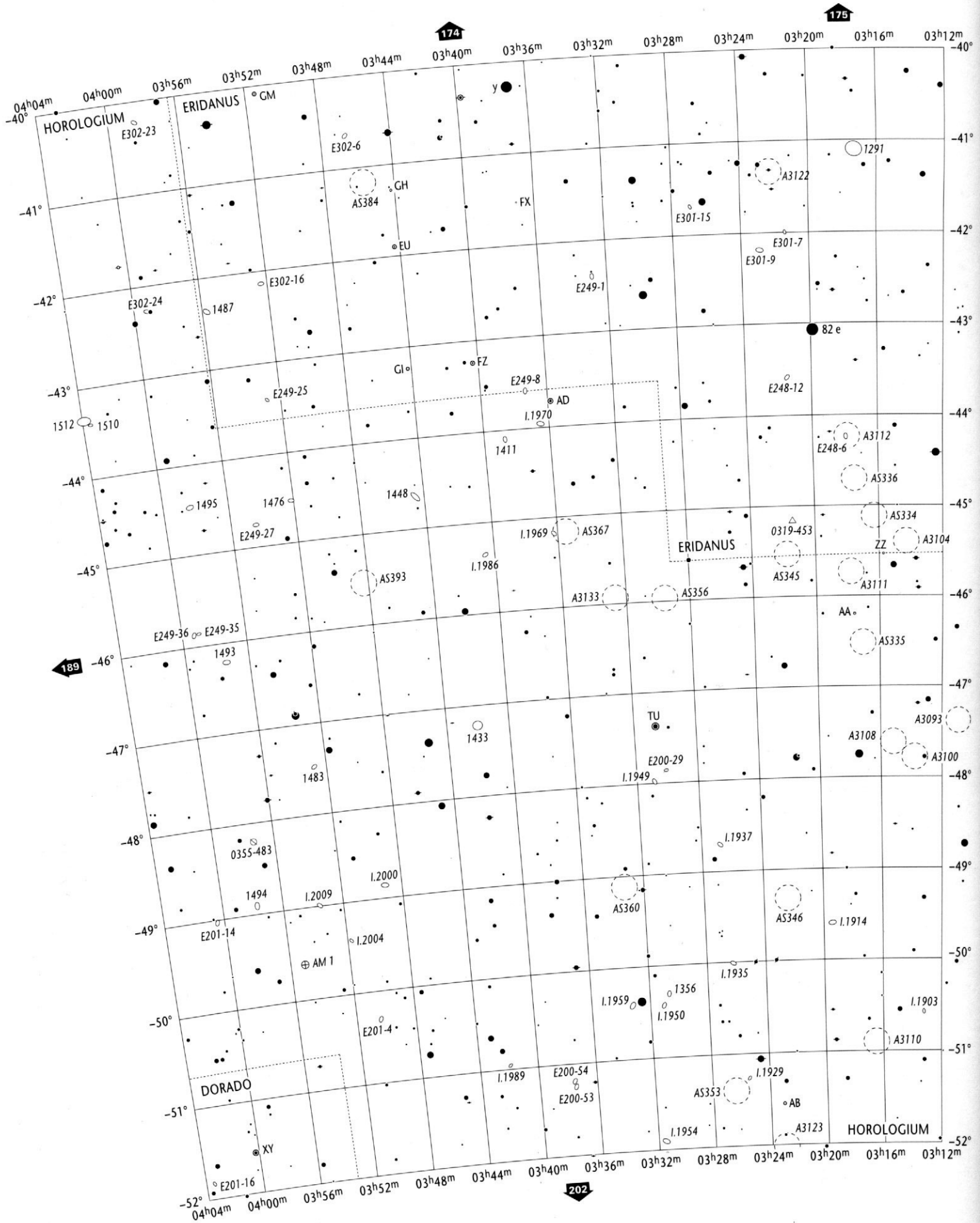


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

03h56m to 05h40m
-40° to -52°

PIC
CAE, HOR, COL, DOR

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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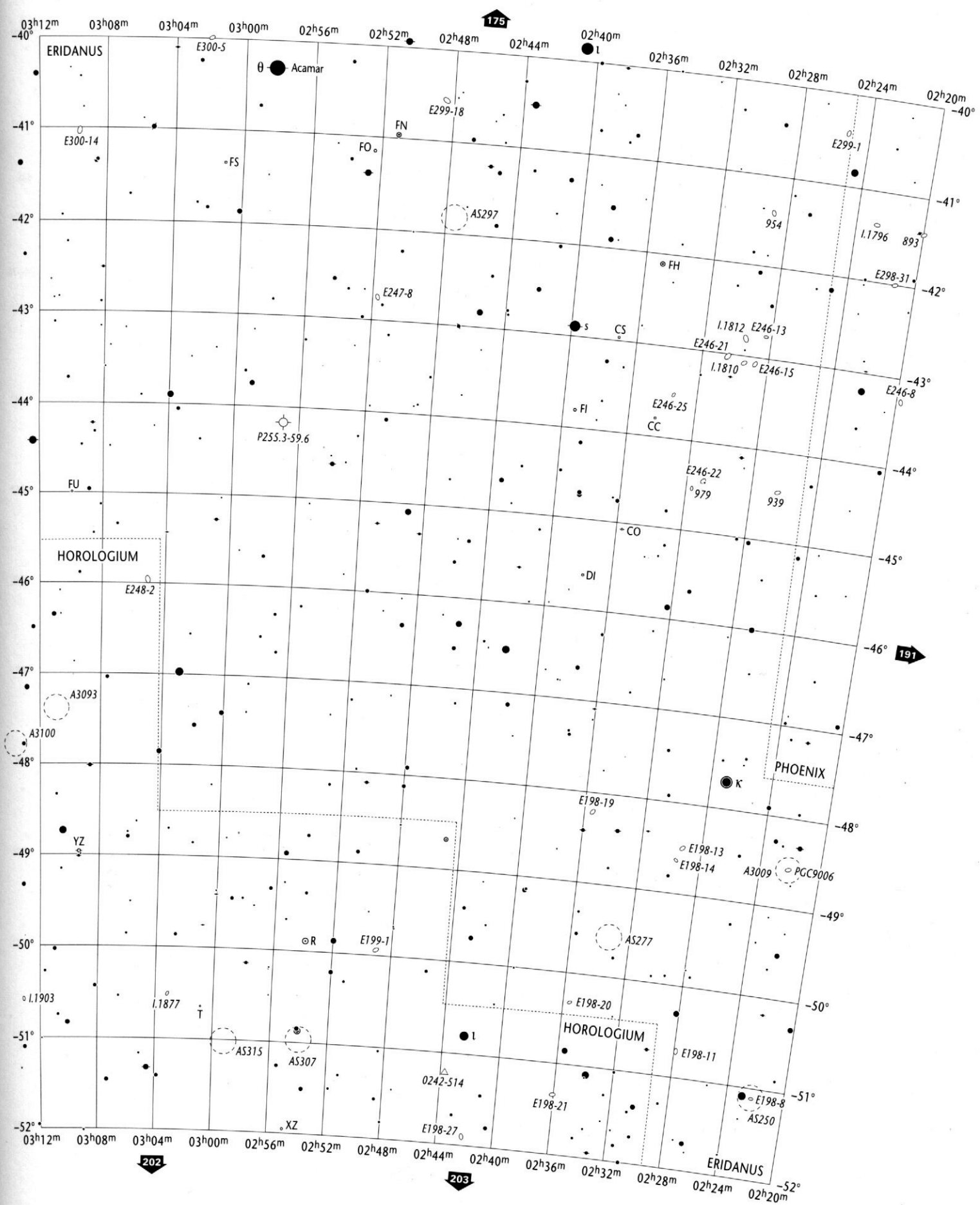
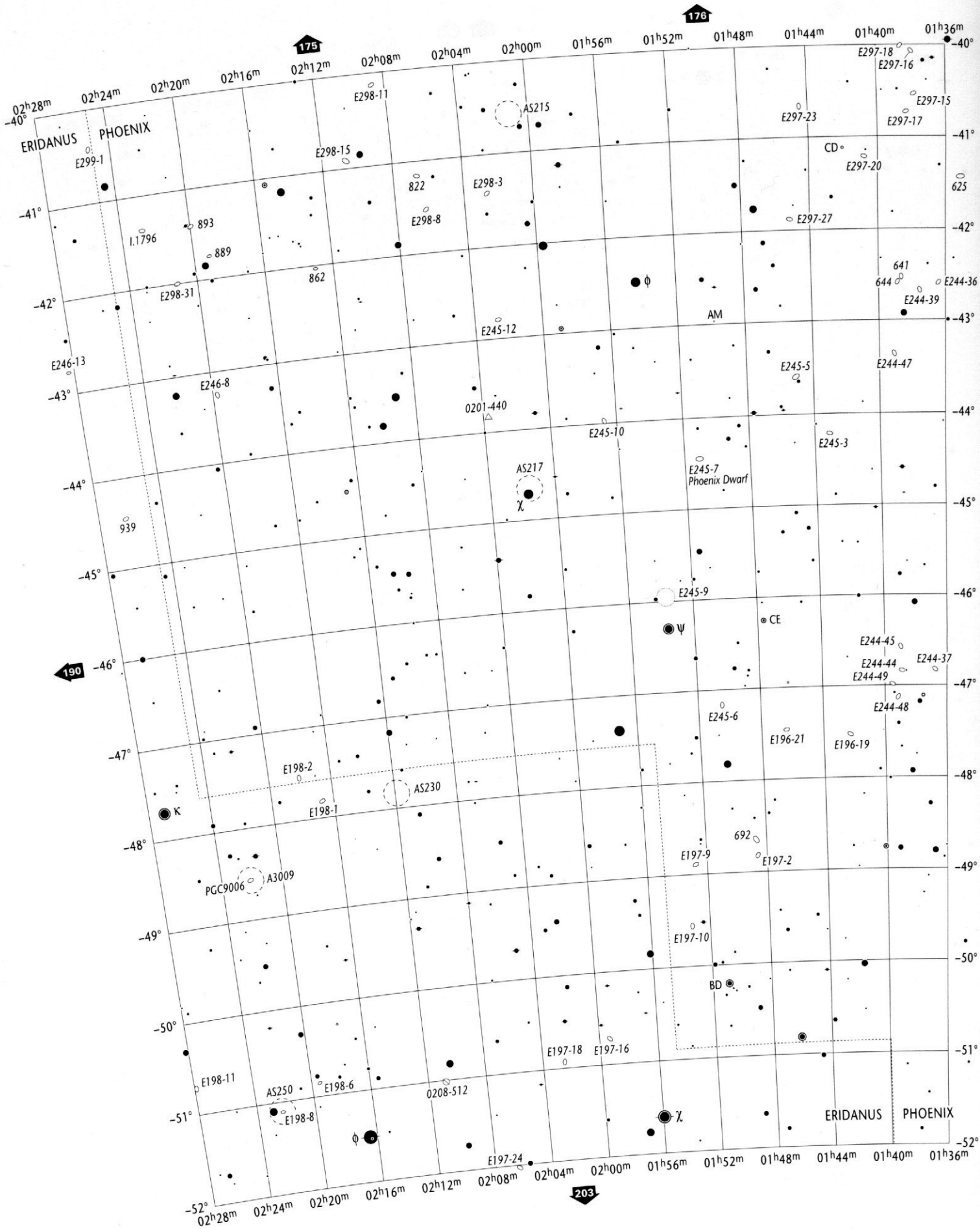


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

02h20m to 04h04m
-40° to -52°

ERI
HOR, PHE, DOR

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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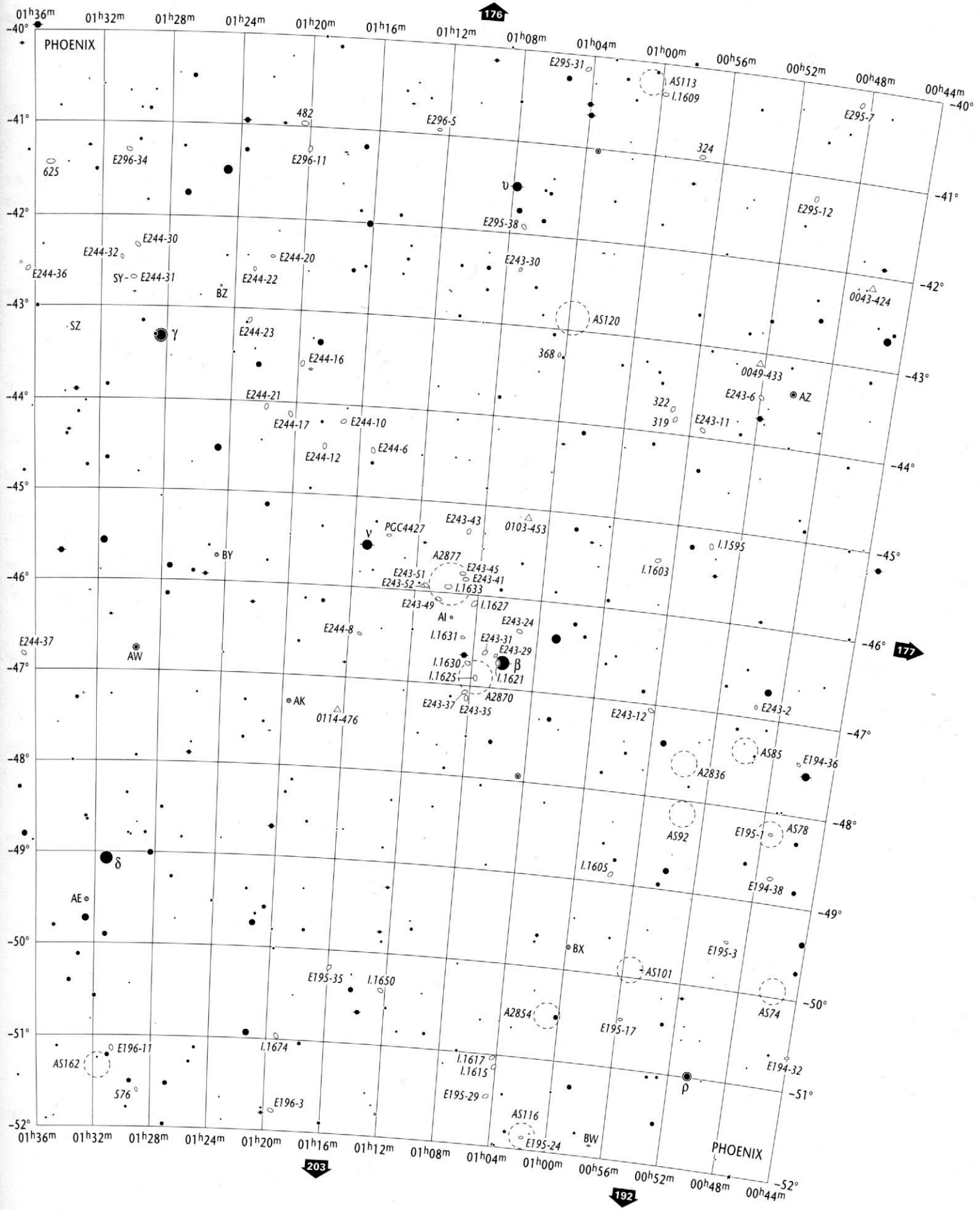
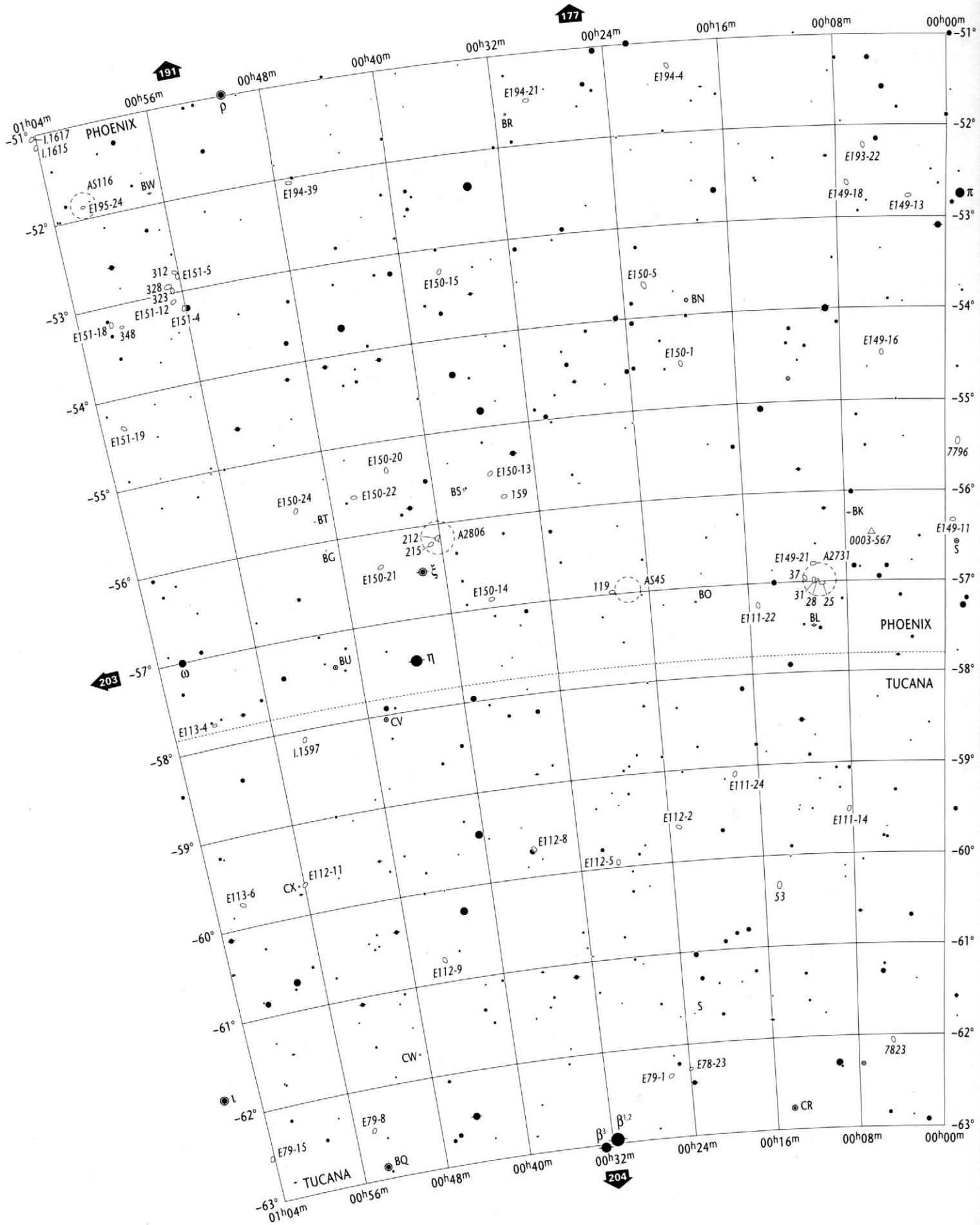


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

00h44m to 02h28m
-40° to -52°

PHE
ERI

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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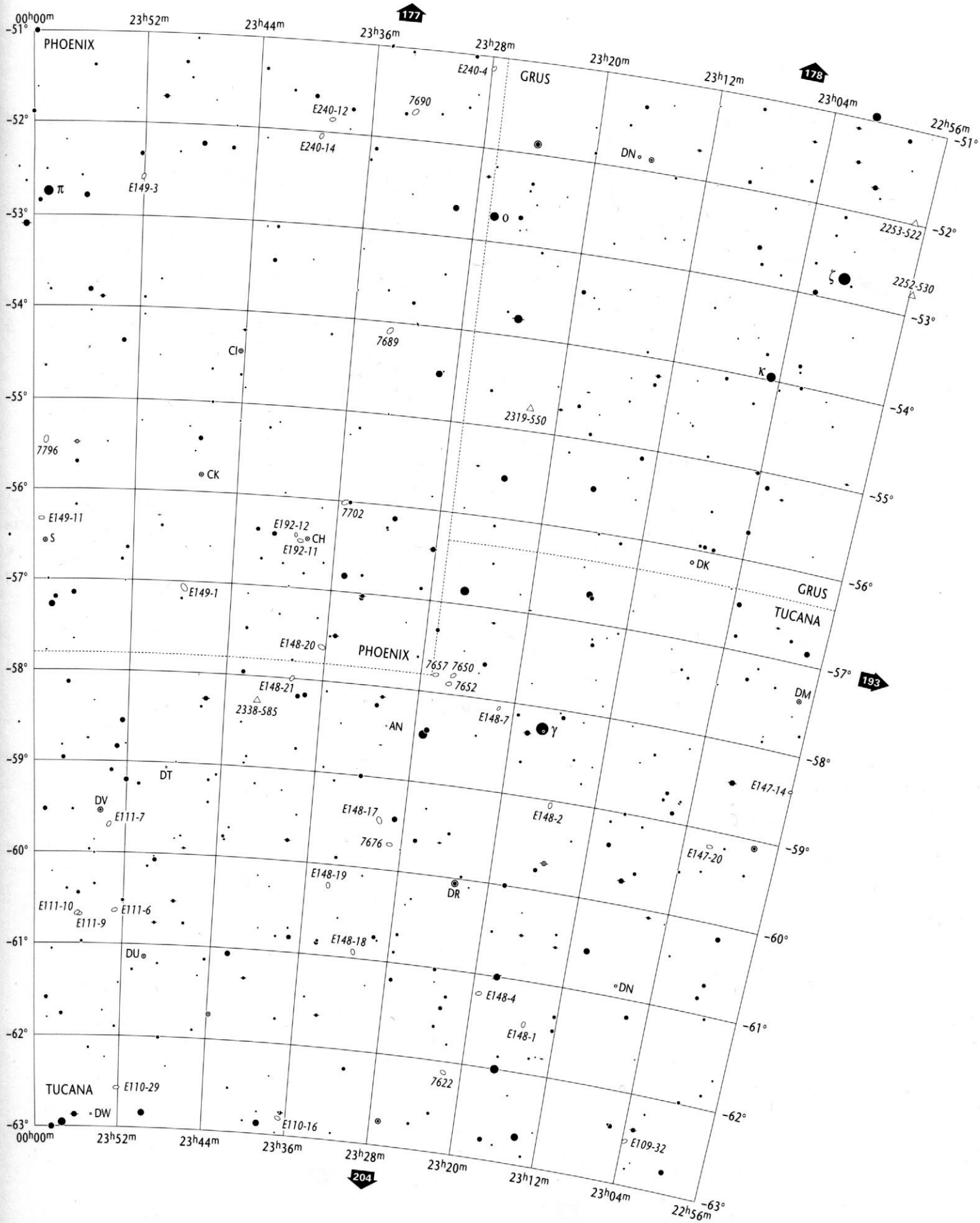
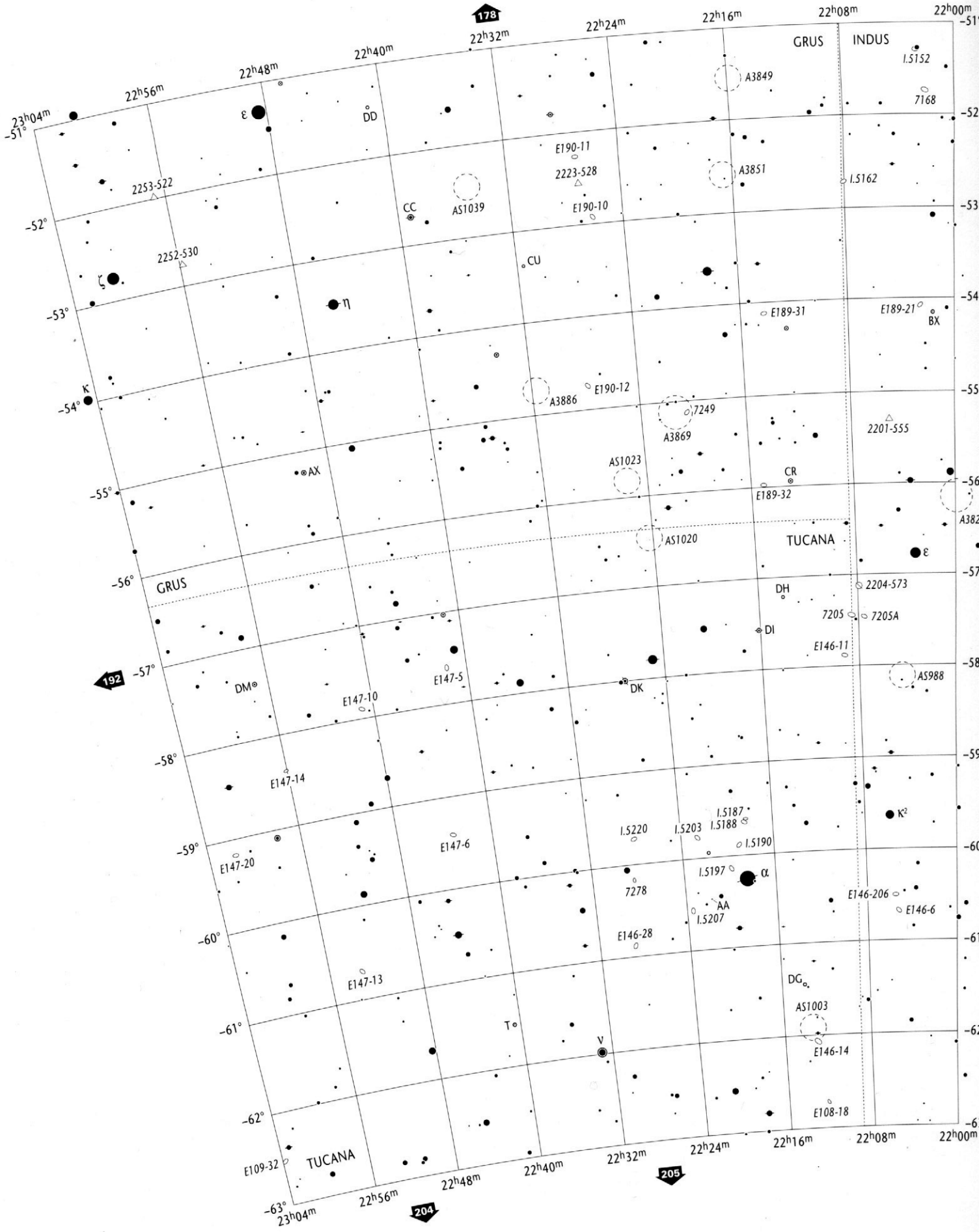


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	01^h04^m to 22^h56^m / $-51°$ to $-63°$	TUC
to scale, <5'	to scale, <5'	>30", 30"-10", 10"-5", <5"	to scale, 10'-5', <5'	>5' to scale; 5'-2', 2'-1', <1' major axis	to scale		PHE, ERI, GRU

Wil Tirion / Barry Rappaport / Will Remaklus



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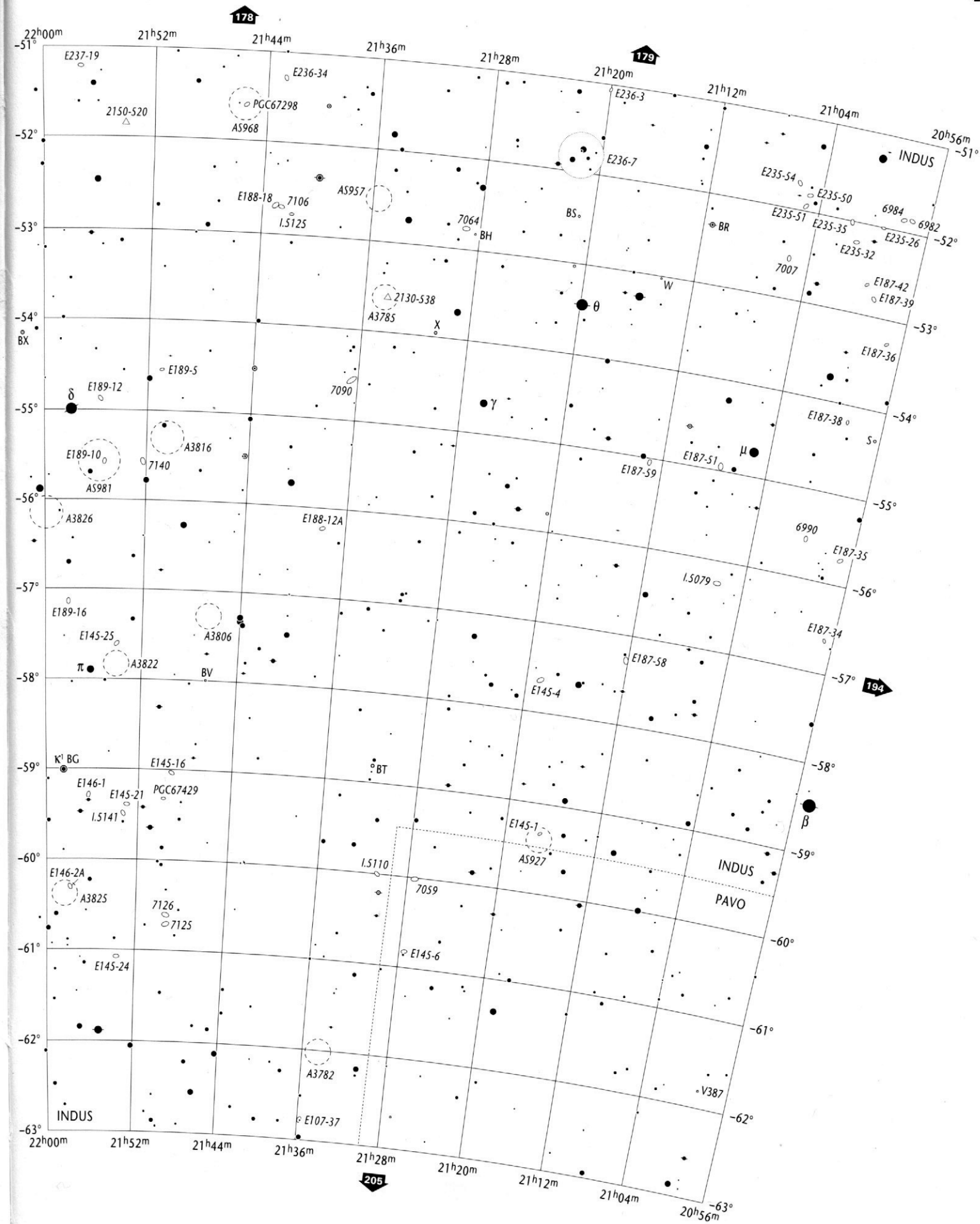
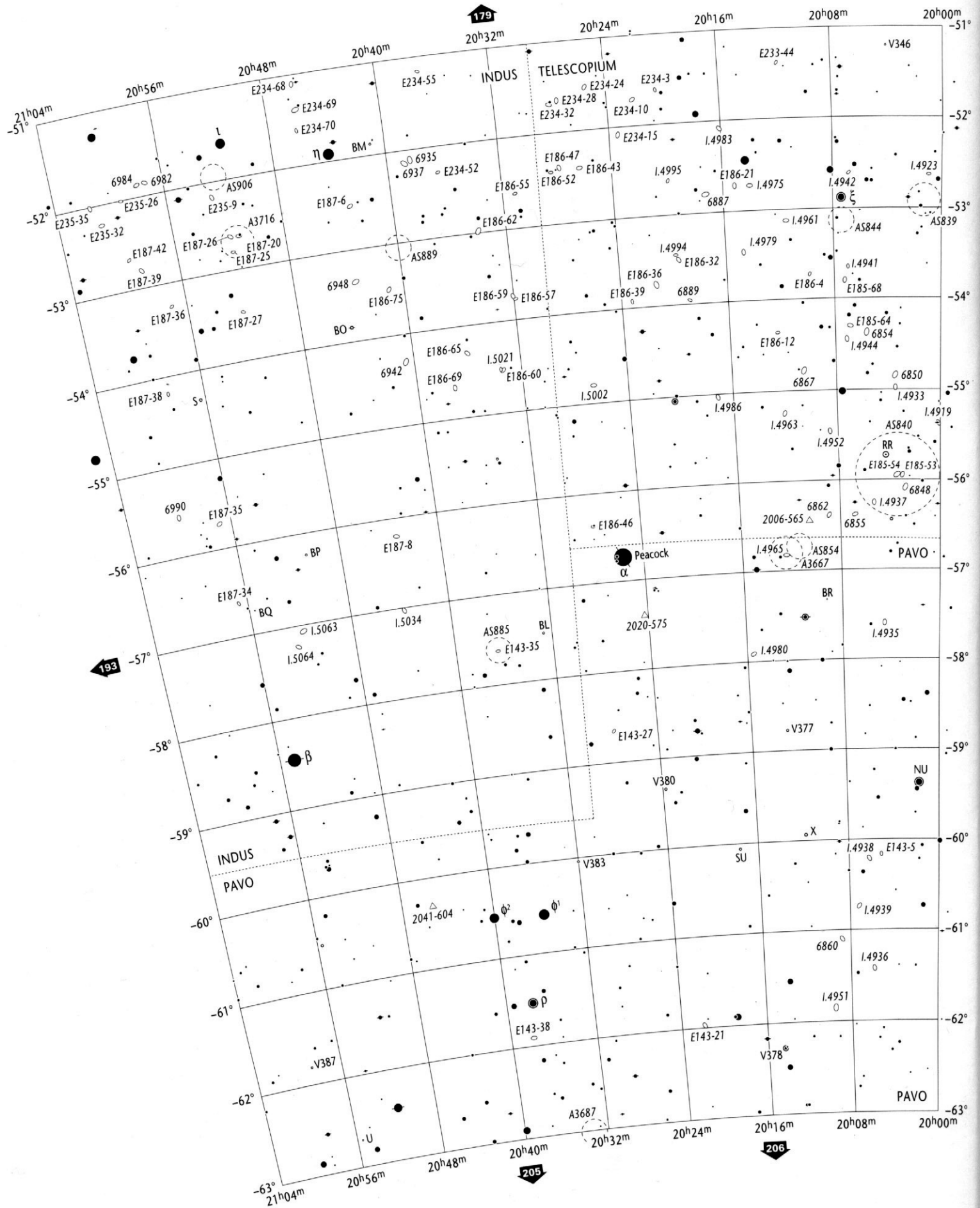


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale · < 5'	to scale · < 5'	>30" · 30"-10" · 10"-5" · < 5"	to scale · 10' - 5' · < 5'	> 5' to scale · 5'-2' · 2'-1' · < 1' major axis	to scale

20h56m to 23h04m
-51° to -63°

IND
TUC, GRU, PAV

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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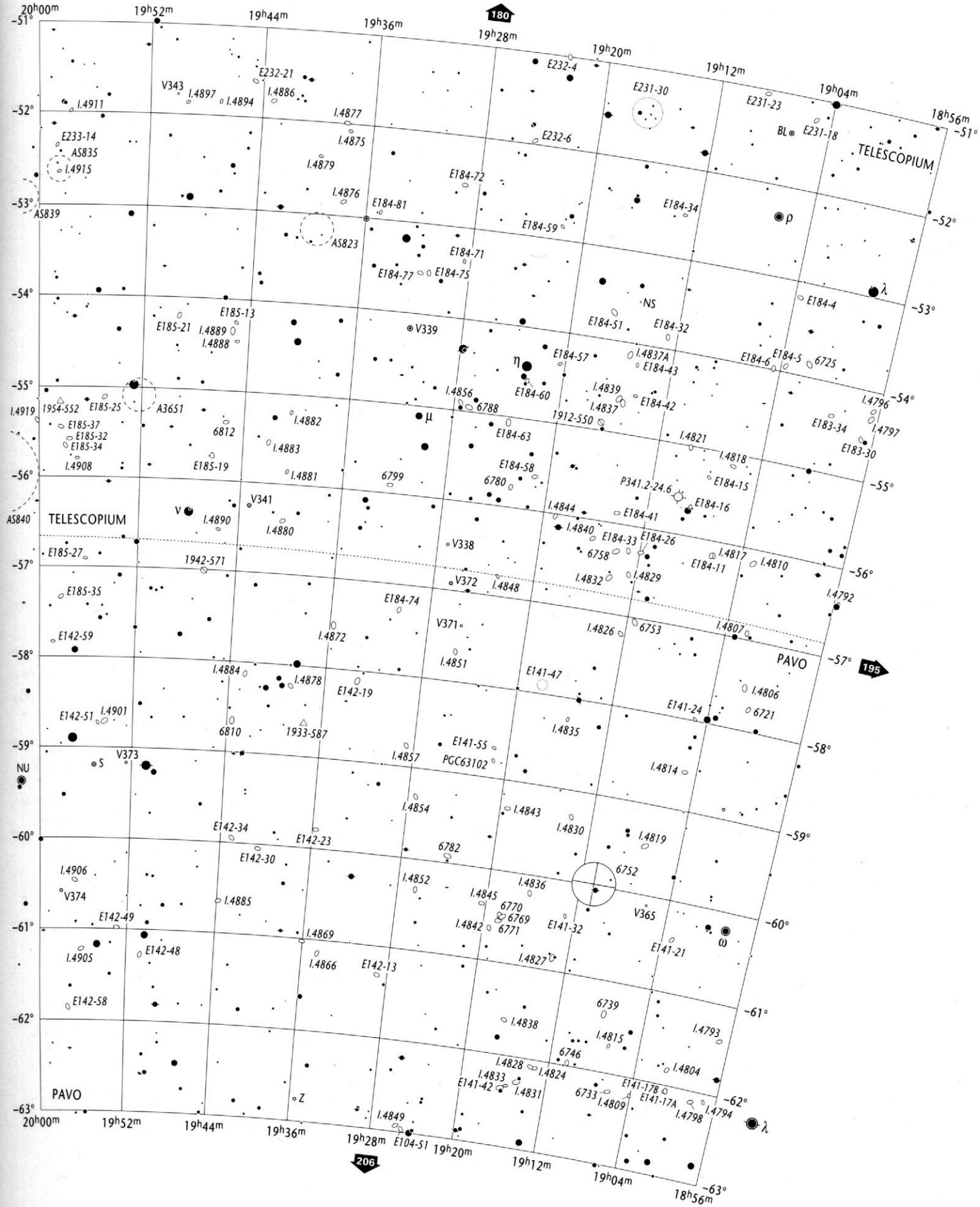
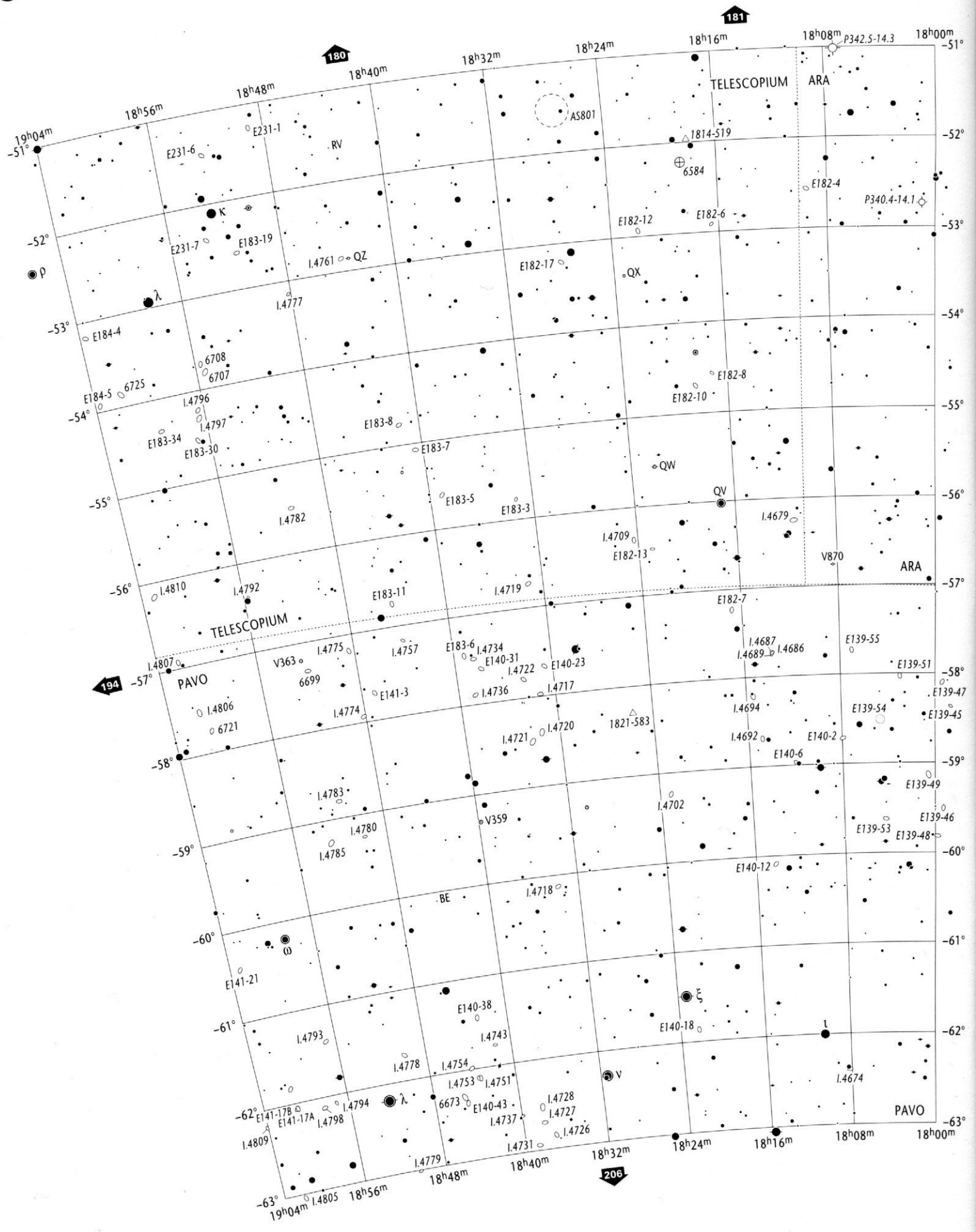


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

18h56m to 21h04m
-51° to -63°

PAV
TEL, IND

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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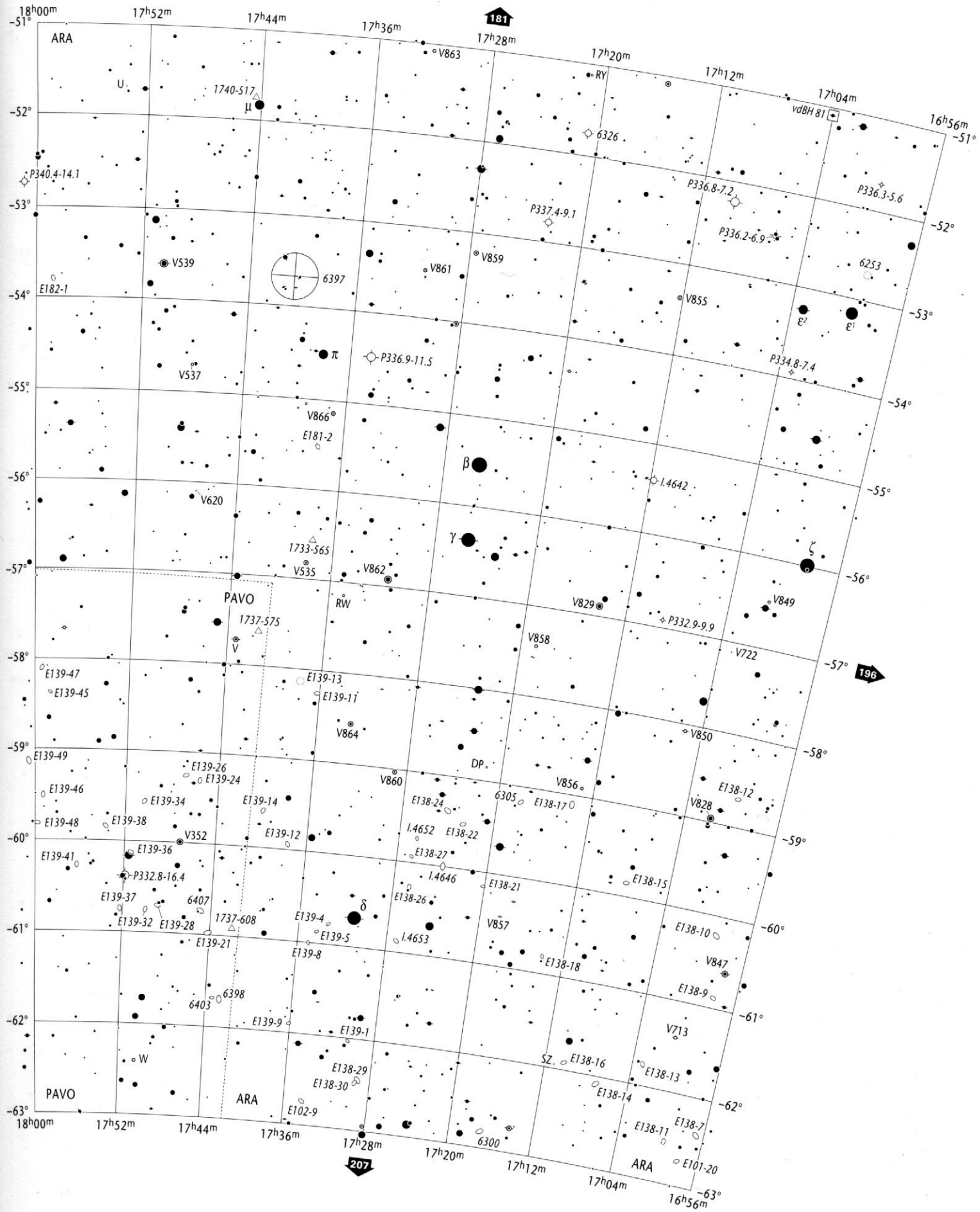
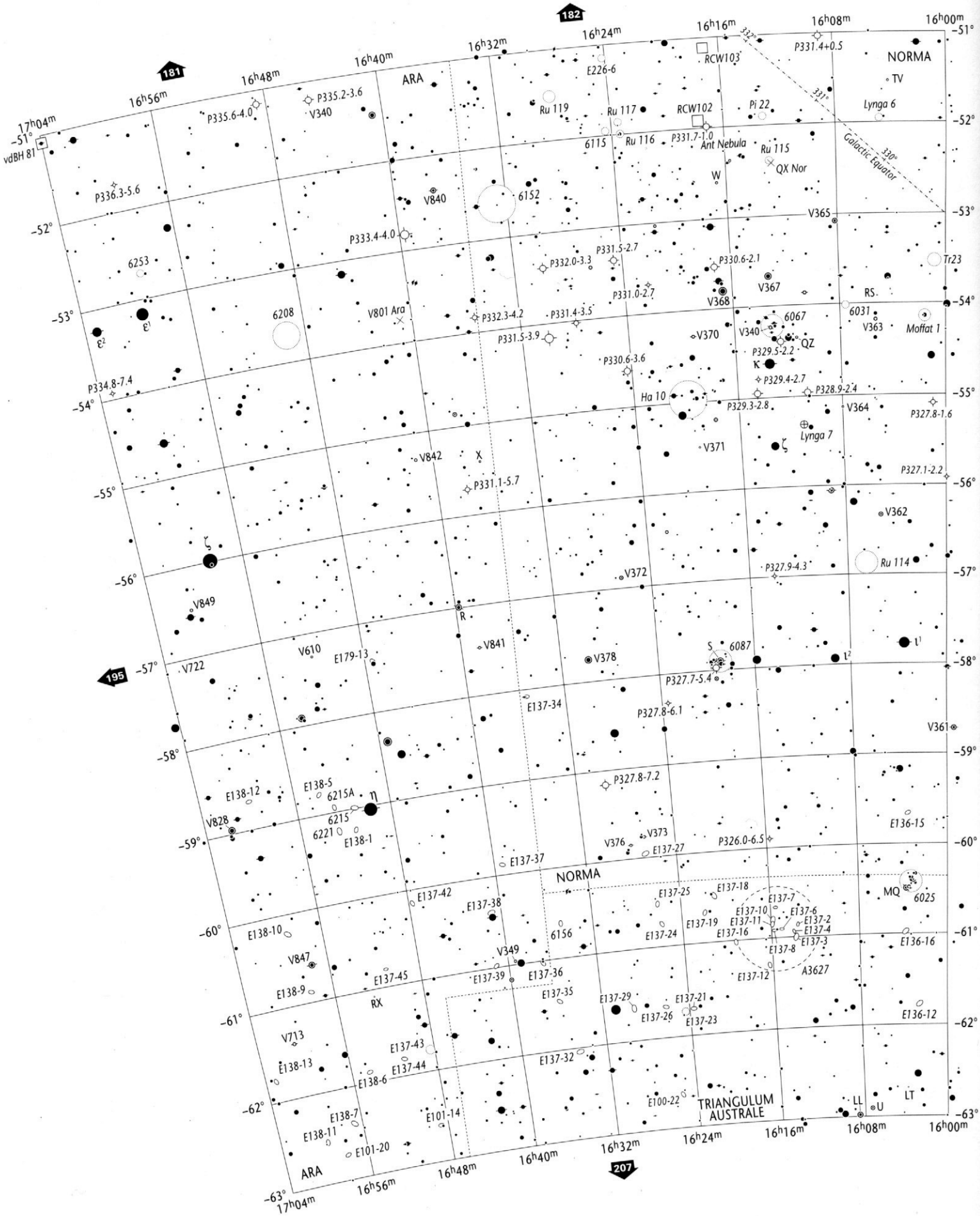


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	16^h56^m to 19^h04^m $-51°$ to $-63°$	ARA PAV, TEL
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



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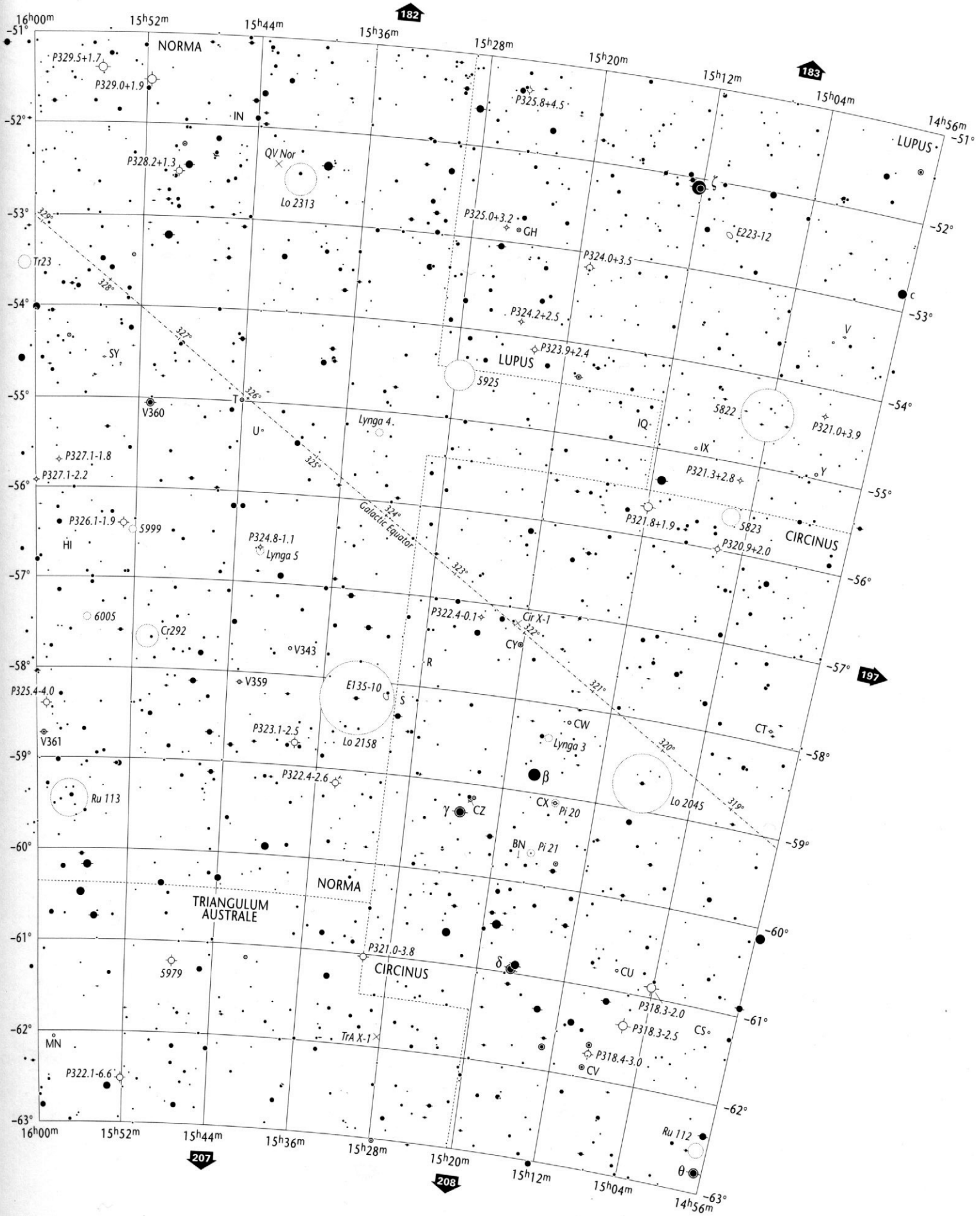
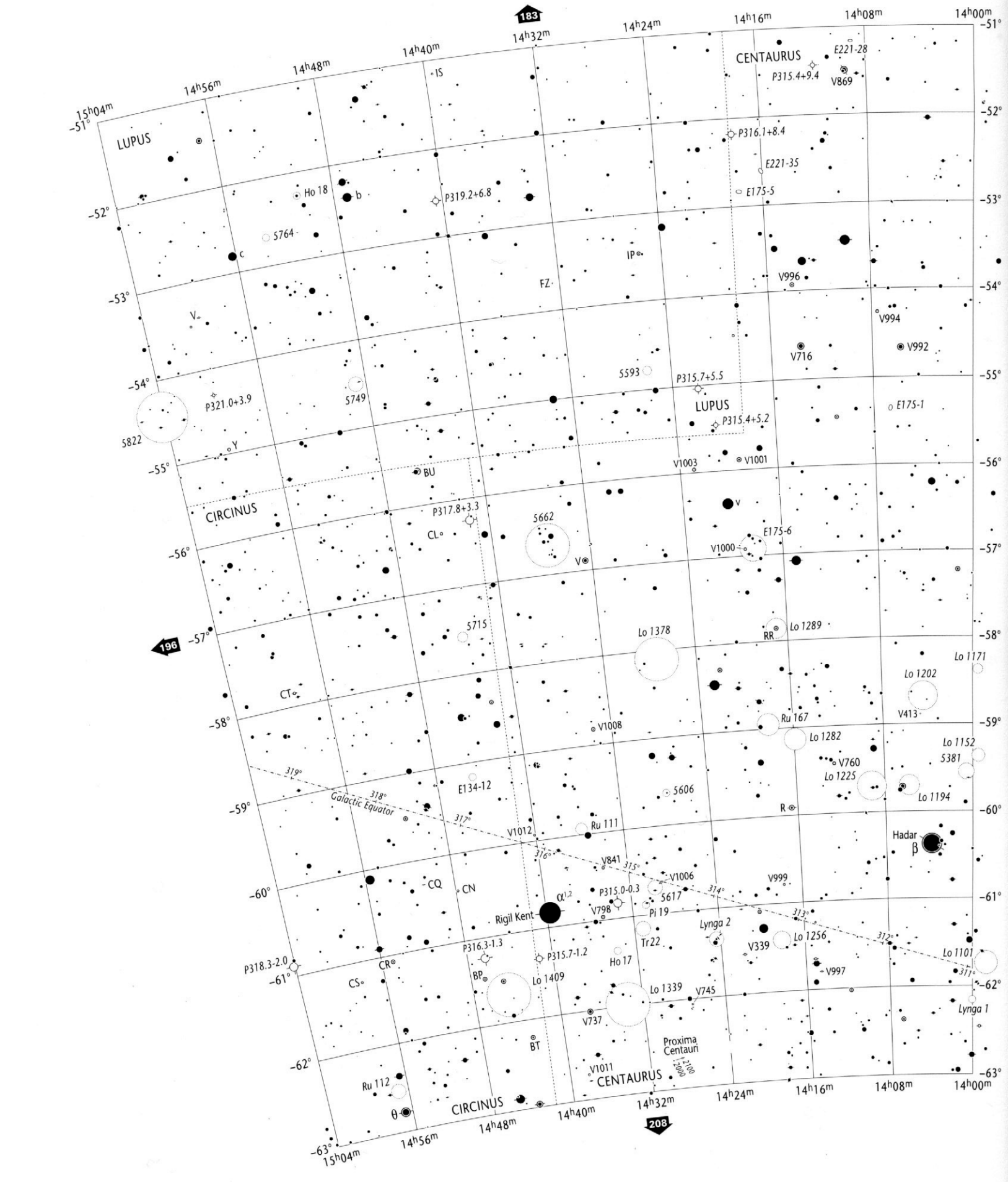


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30° 30°-10° 10°-5° < 5°	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale

14h56m to 17h04m
-51° to -63°

NOR
ARA, CIR, TRA, LUP

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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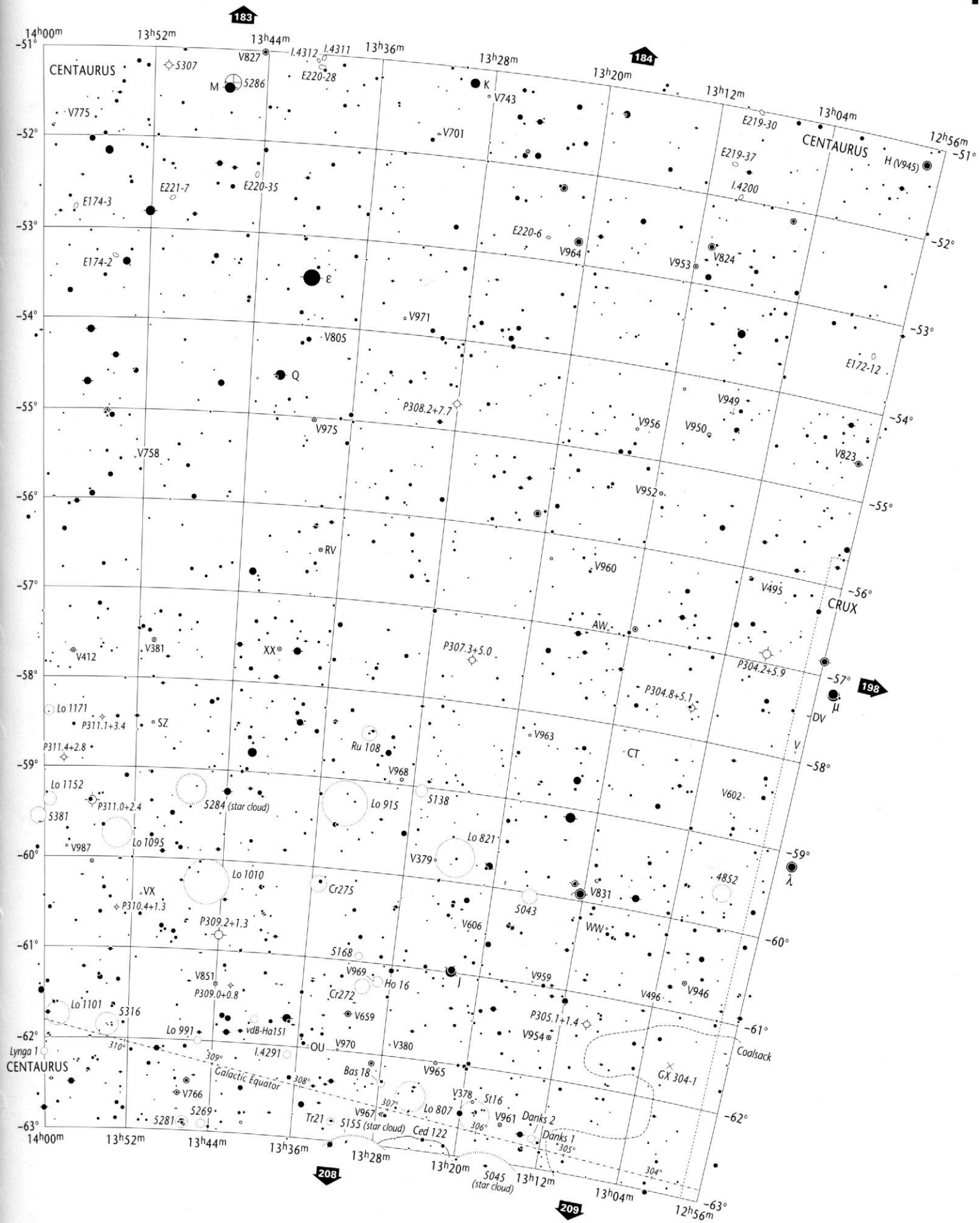
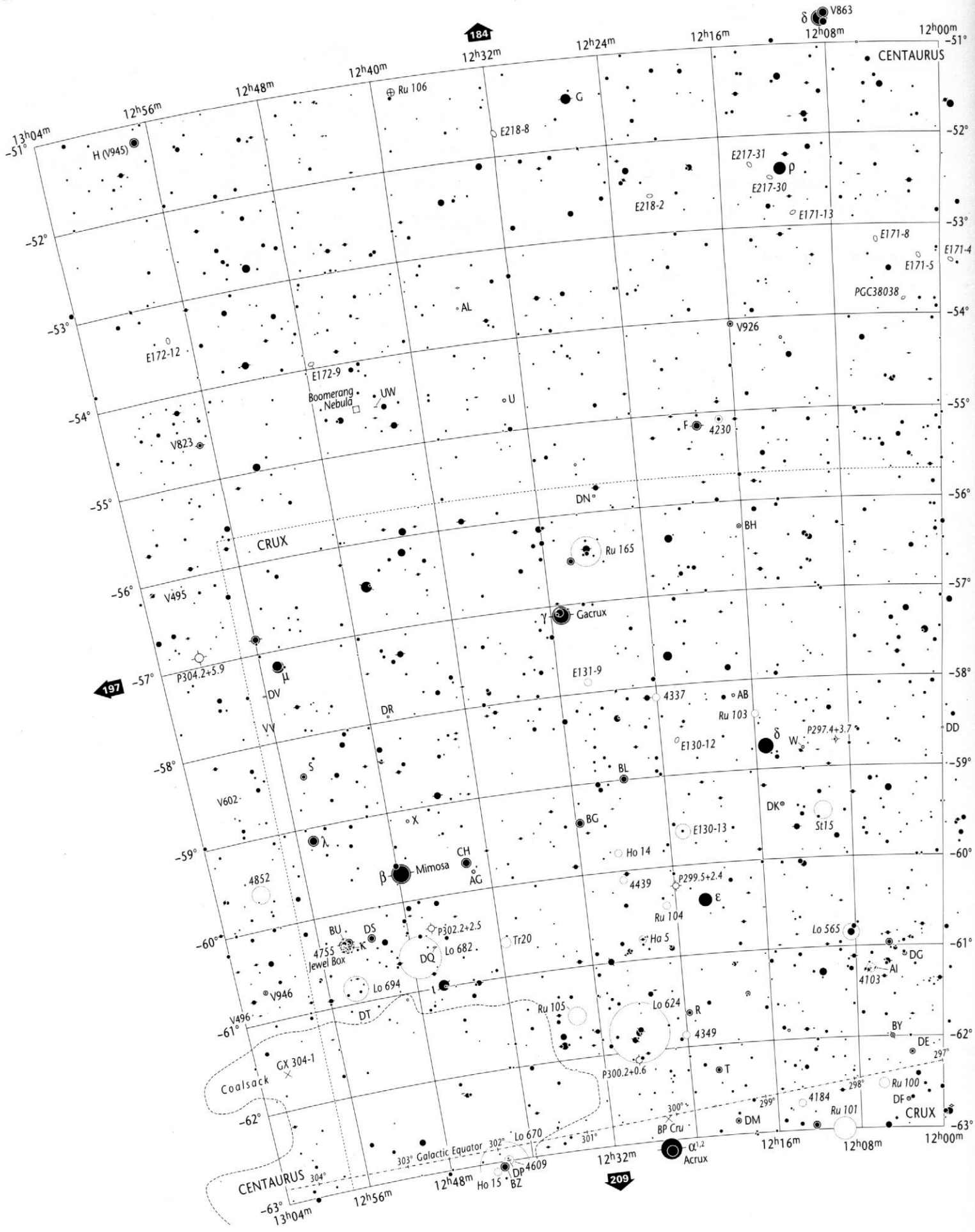


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	12^h56^m to 15^h04^m / −51° to −63°	CEN
to scale <5'	to scale <5'	>30" 30"-10" 10"-5" <5"	to scale 10'-5' <5'	>5' to scale; 5'-2' 2'-1' <1' major axis	to scale		LUP, CIR, CRU

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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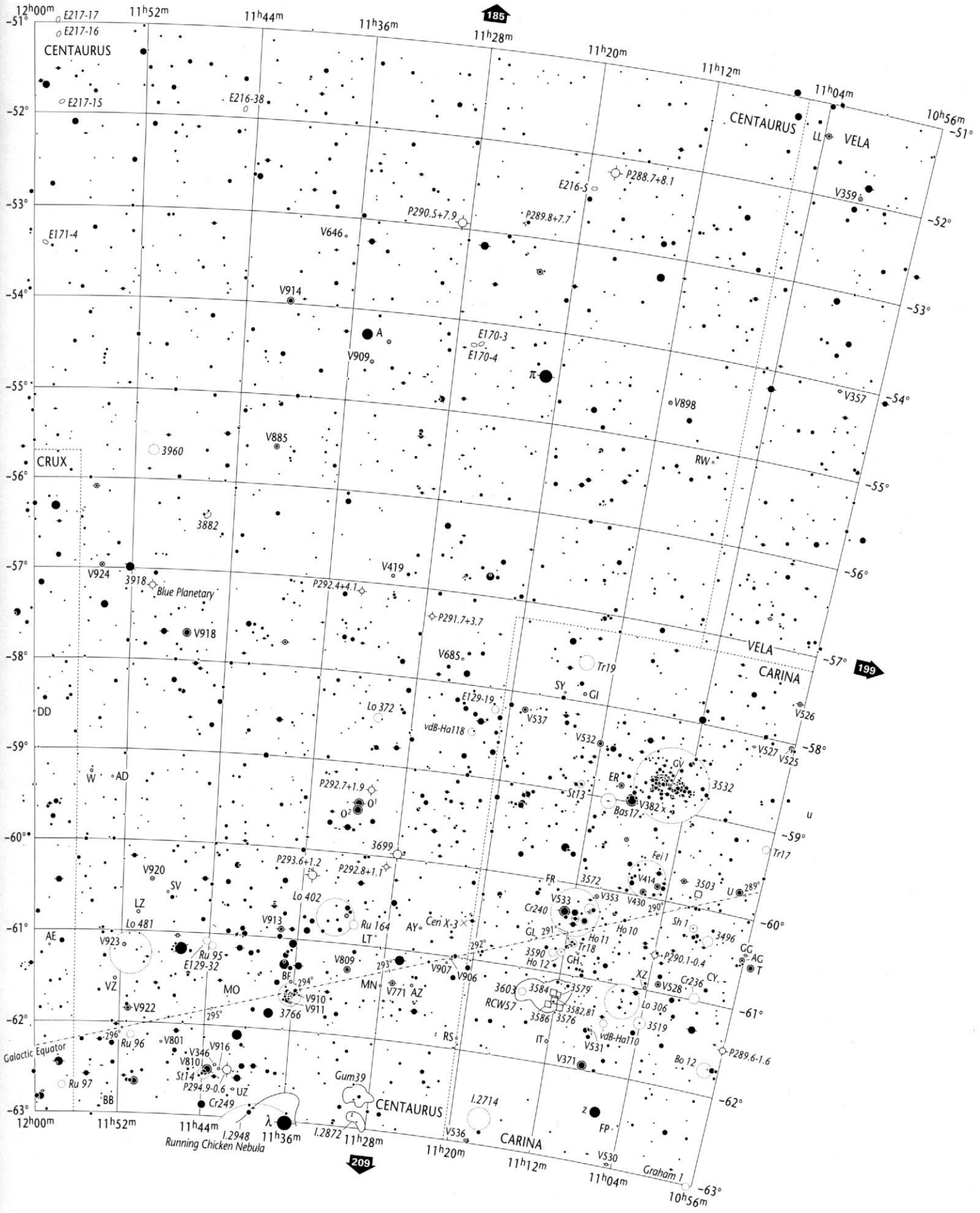
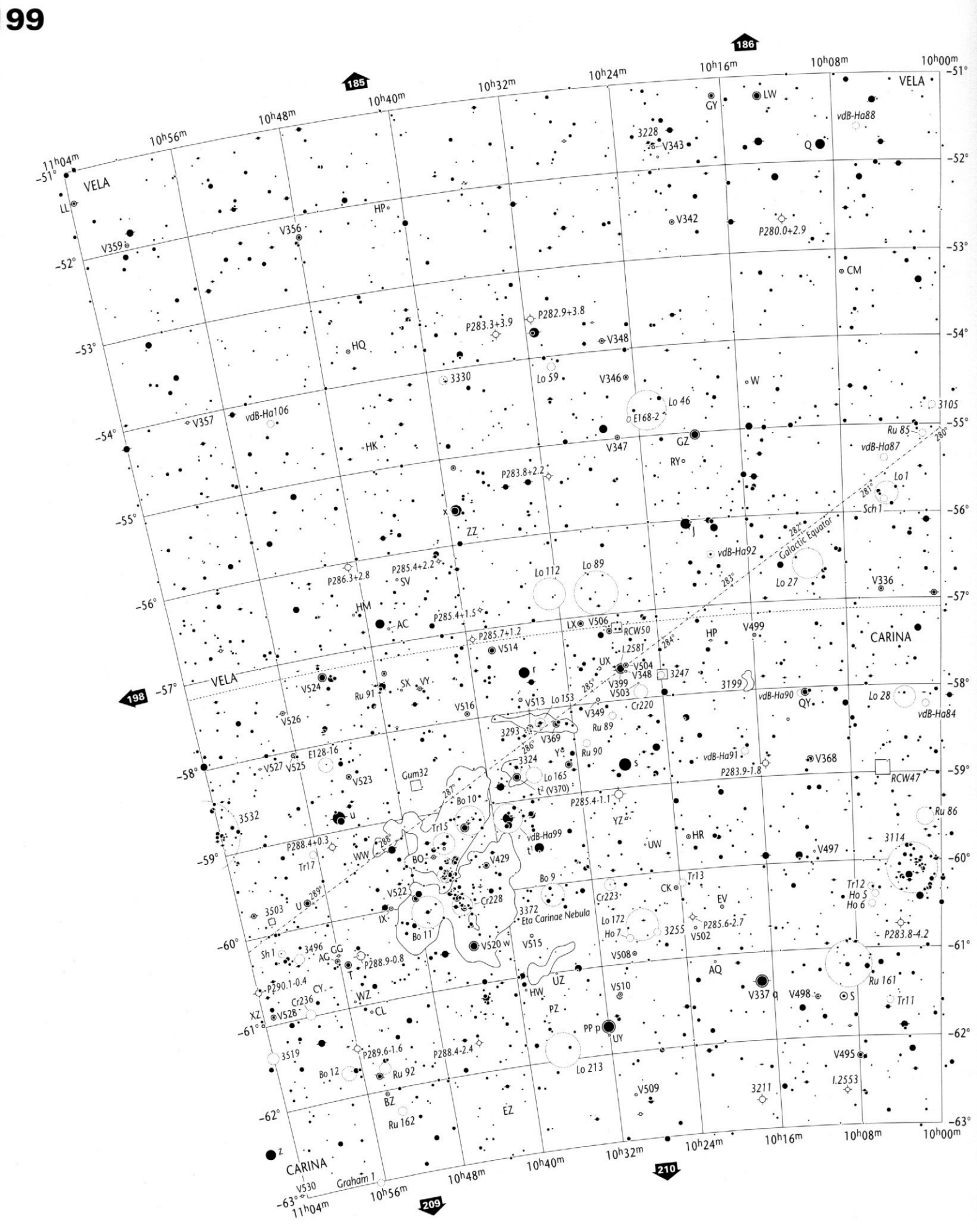


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

10h56m to 13h04m
-51° to -63°

CEN
CRU, CAR, VEL

Will Tirion / Barry Rappaport / Will Remaklus



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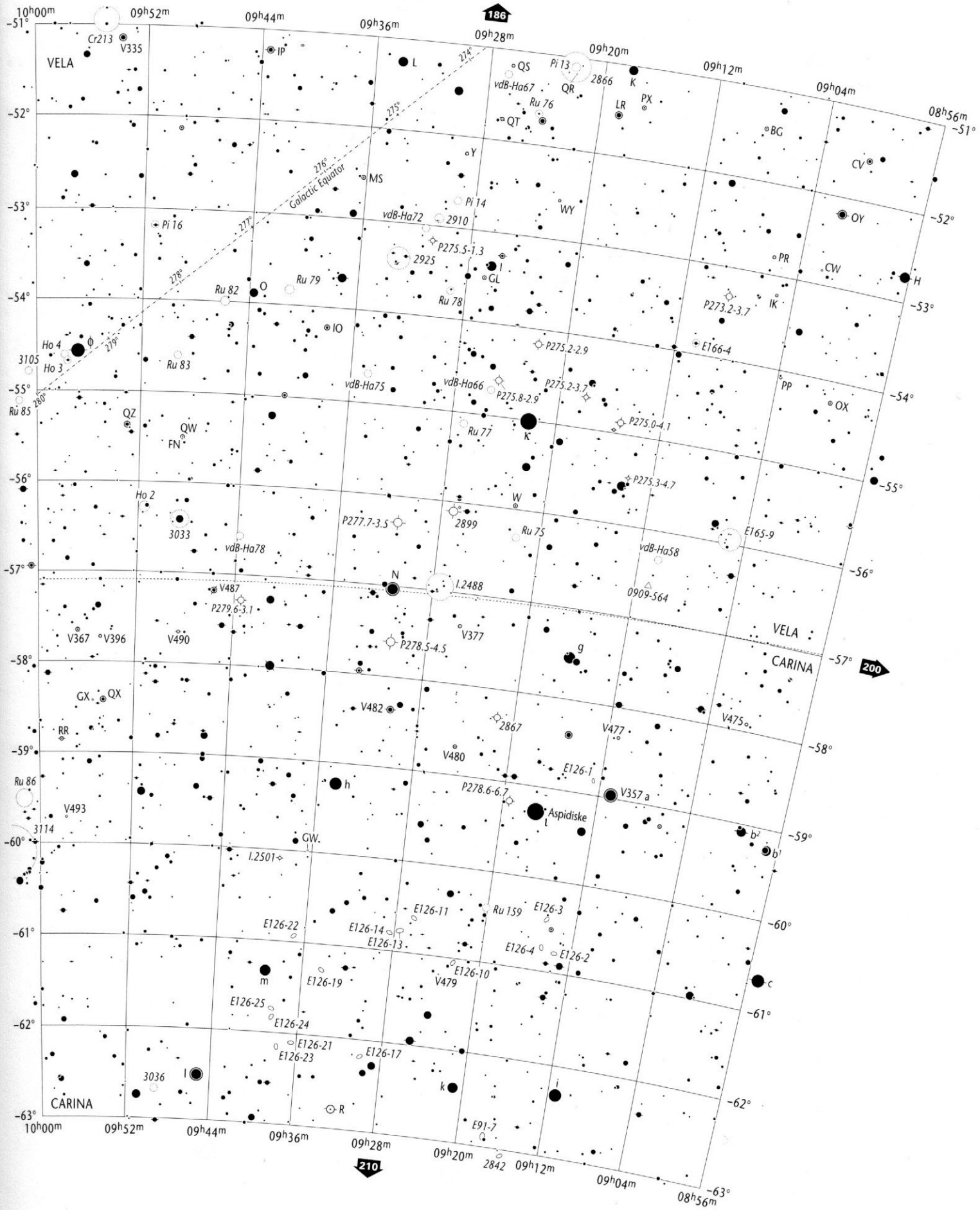
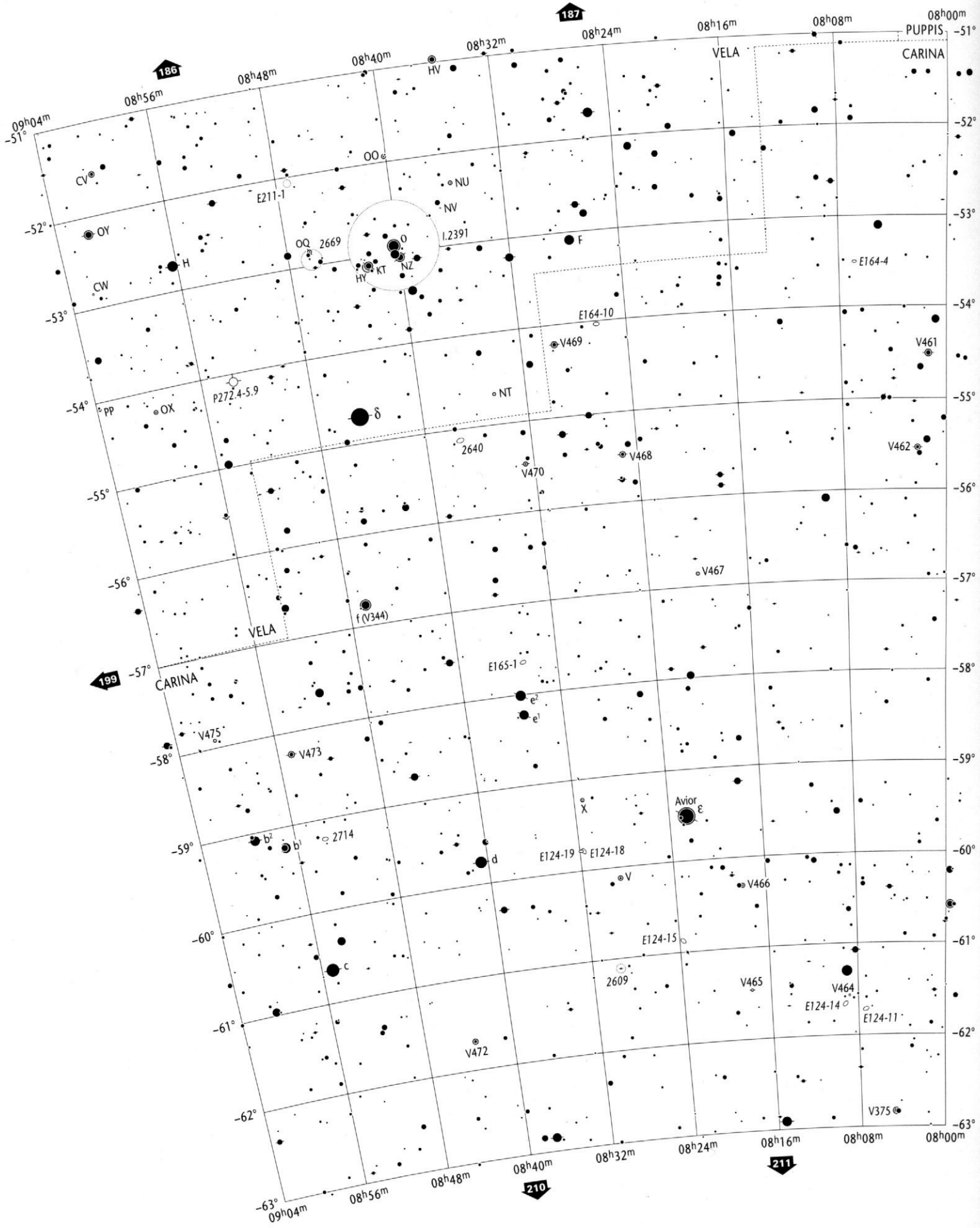


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	08^h56^m to 11^h04^m $-51°$ to $-63°$	VEL CAR
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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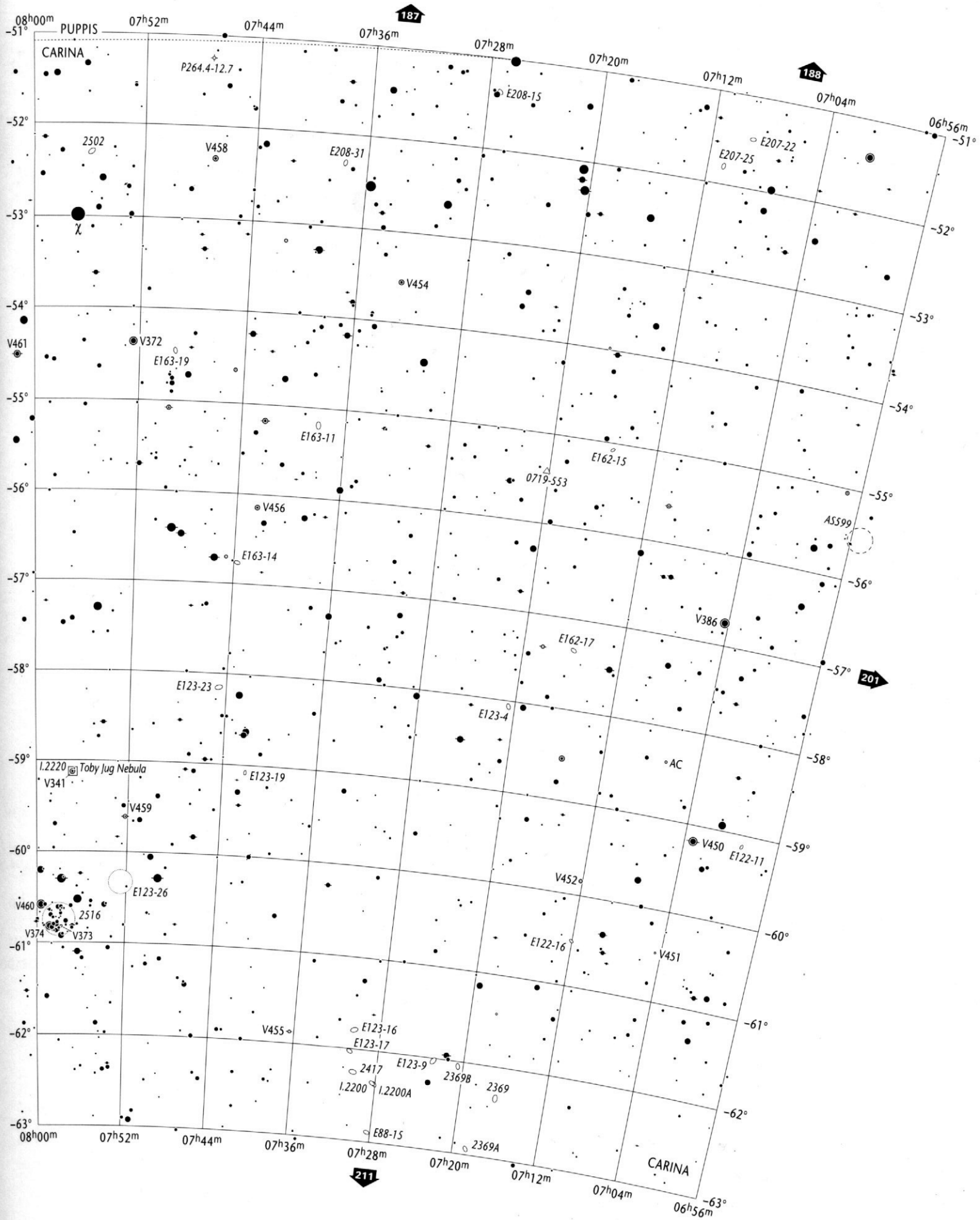
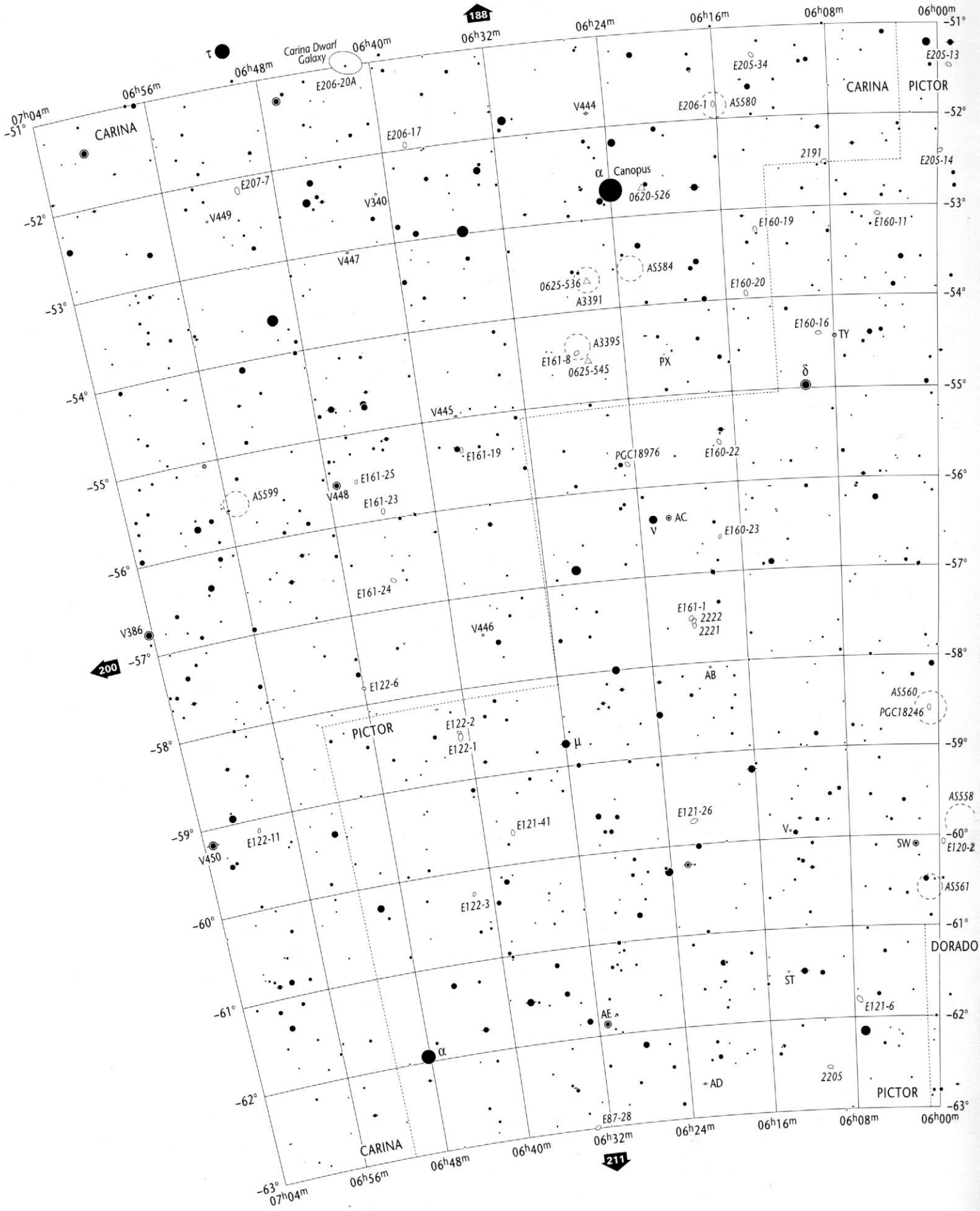


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	06h56m to 09h04m -51° to -63°	CAR VEL, PUP
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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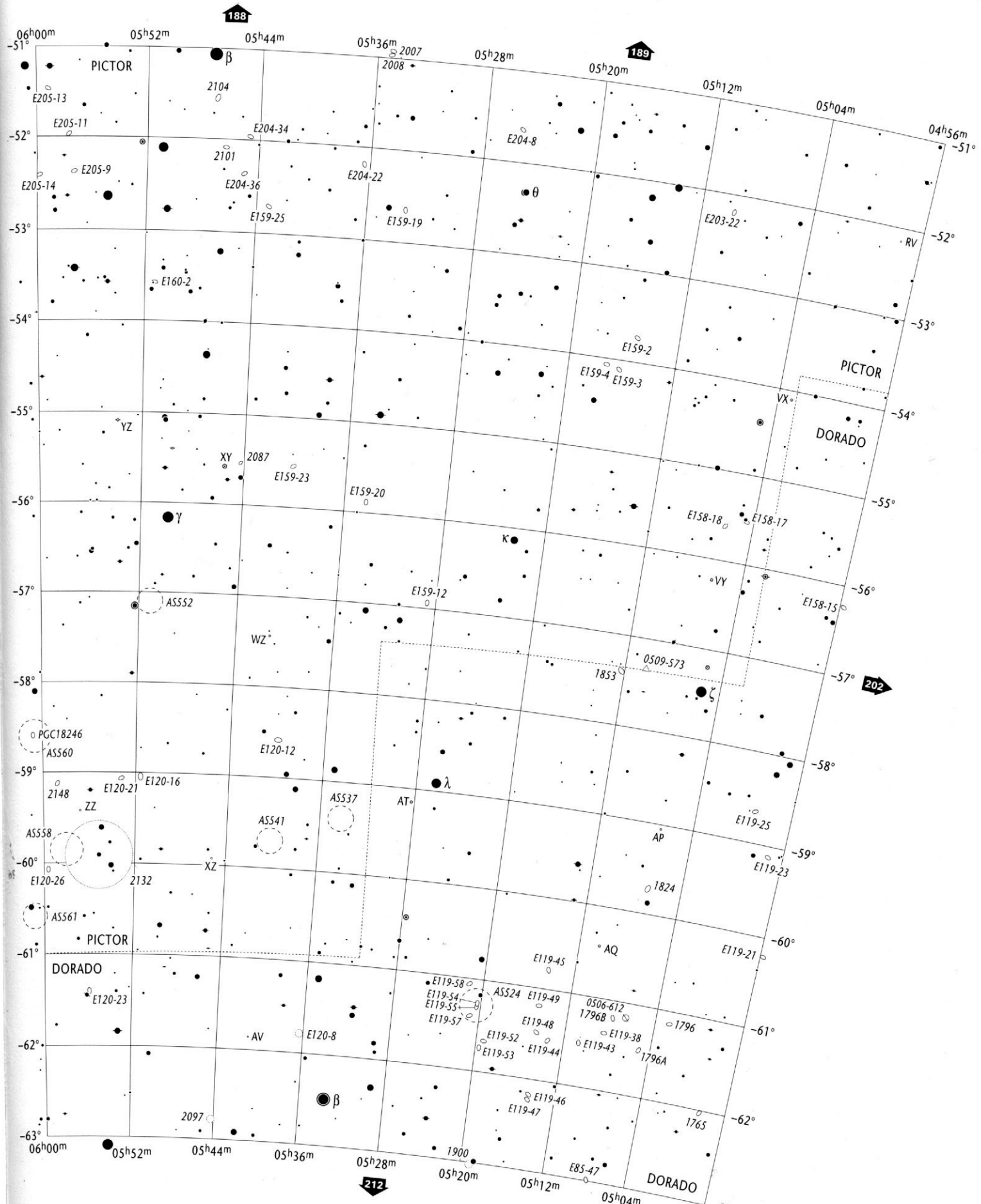
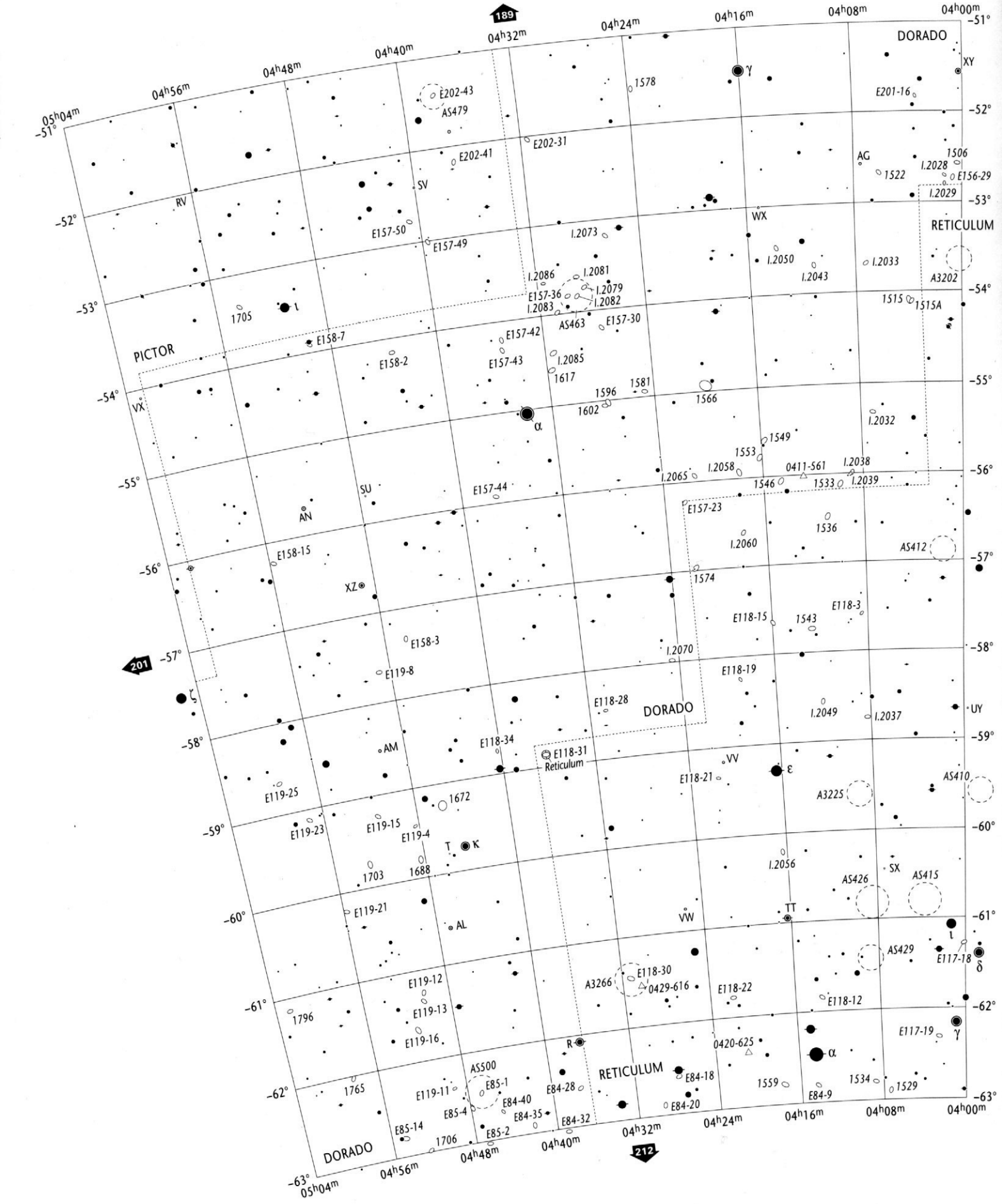


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	04^h56^m to 07^h04^m	PIC
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	$-51°$ to $-63°$	CAR, DOR

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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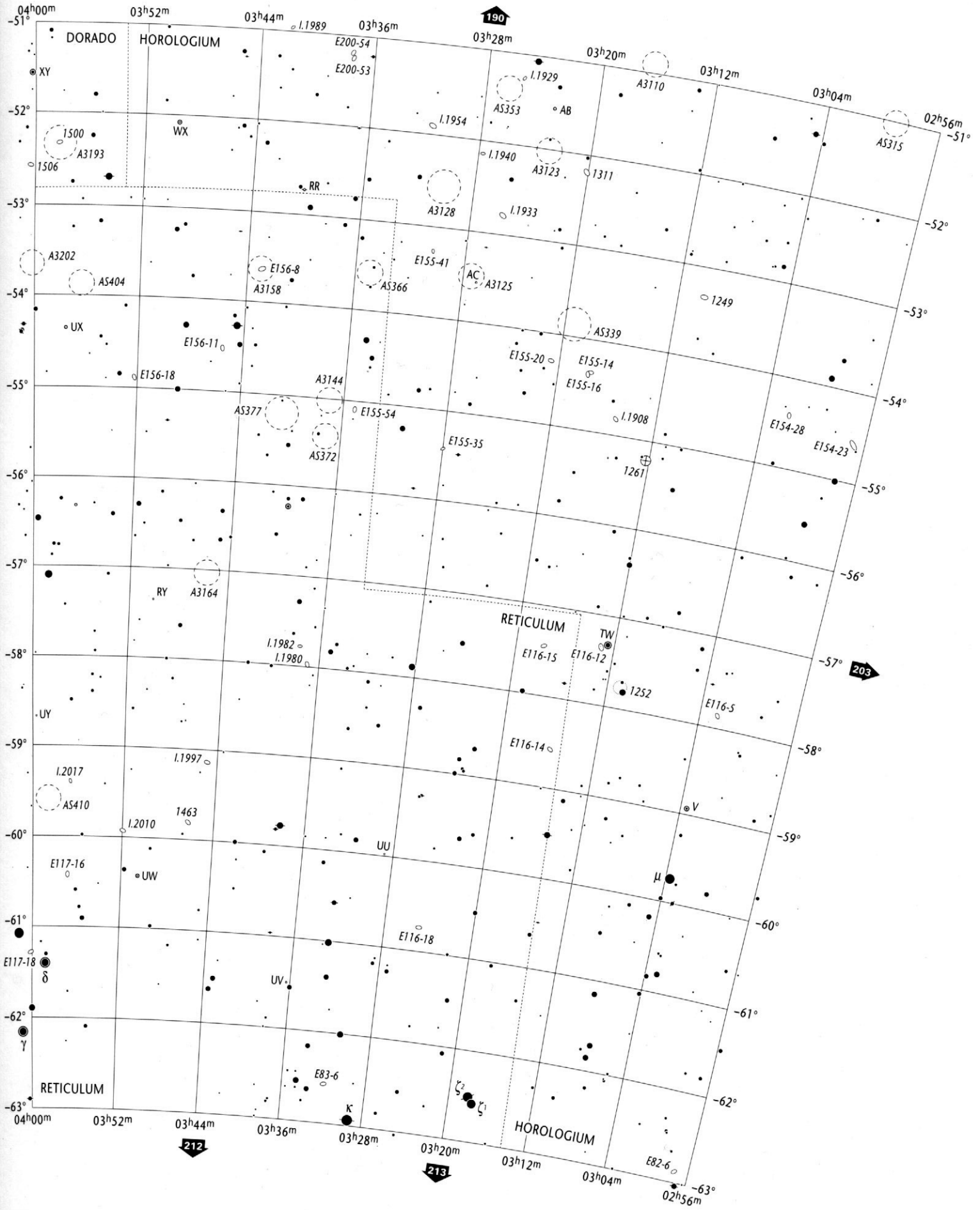
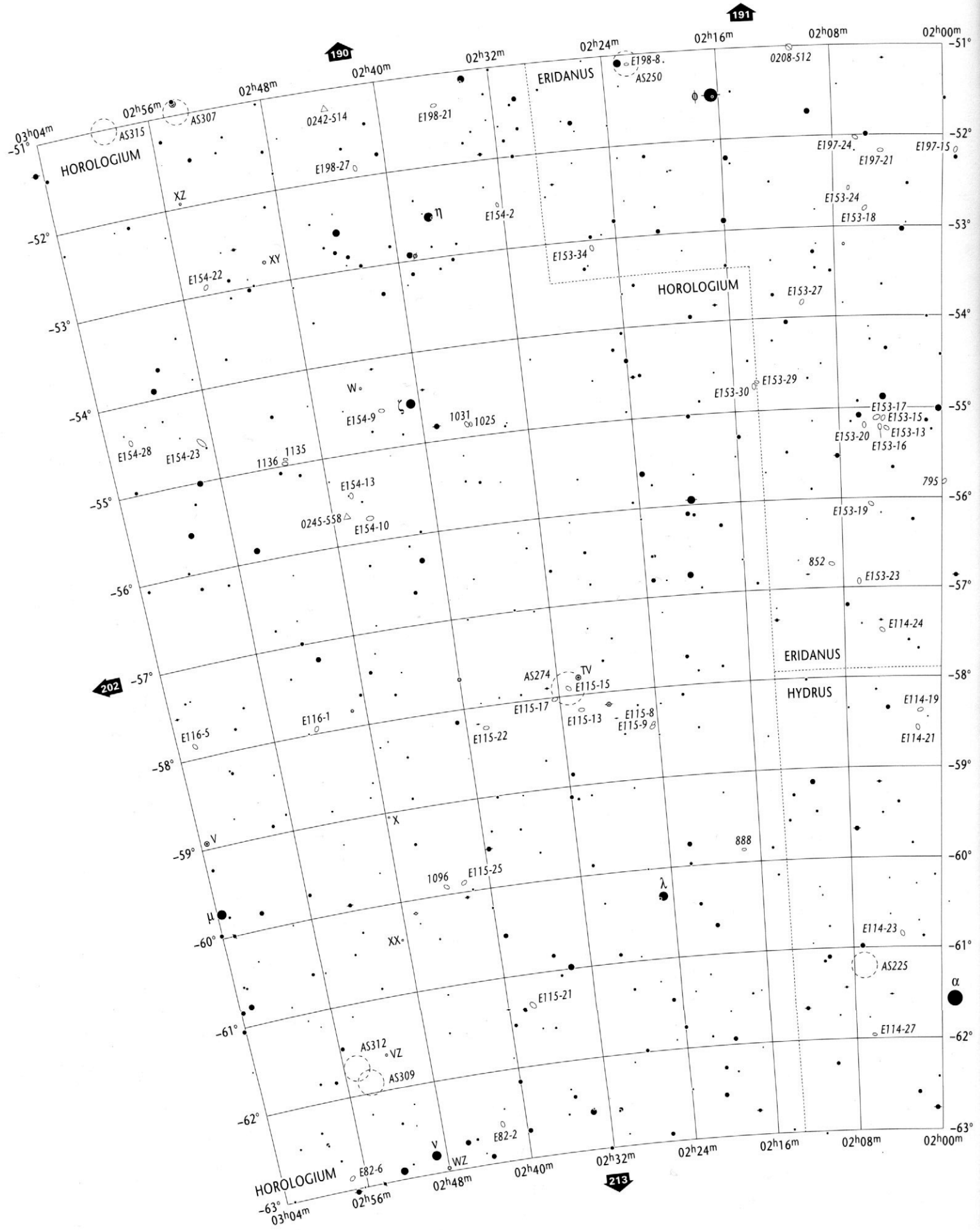


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

02h56m to 05h04m
-51° to -63°

RET
DOR, HOR, PIC

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60°

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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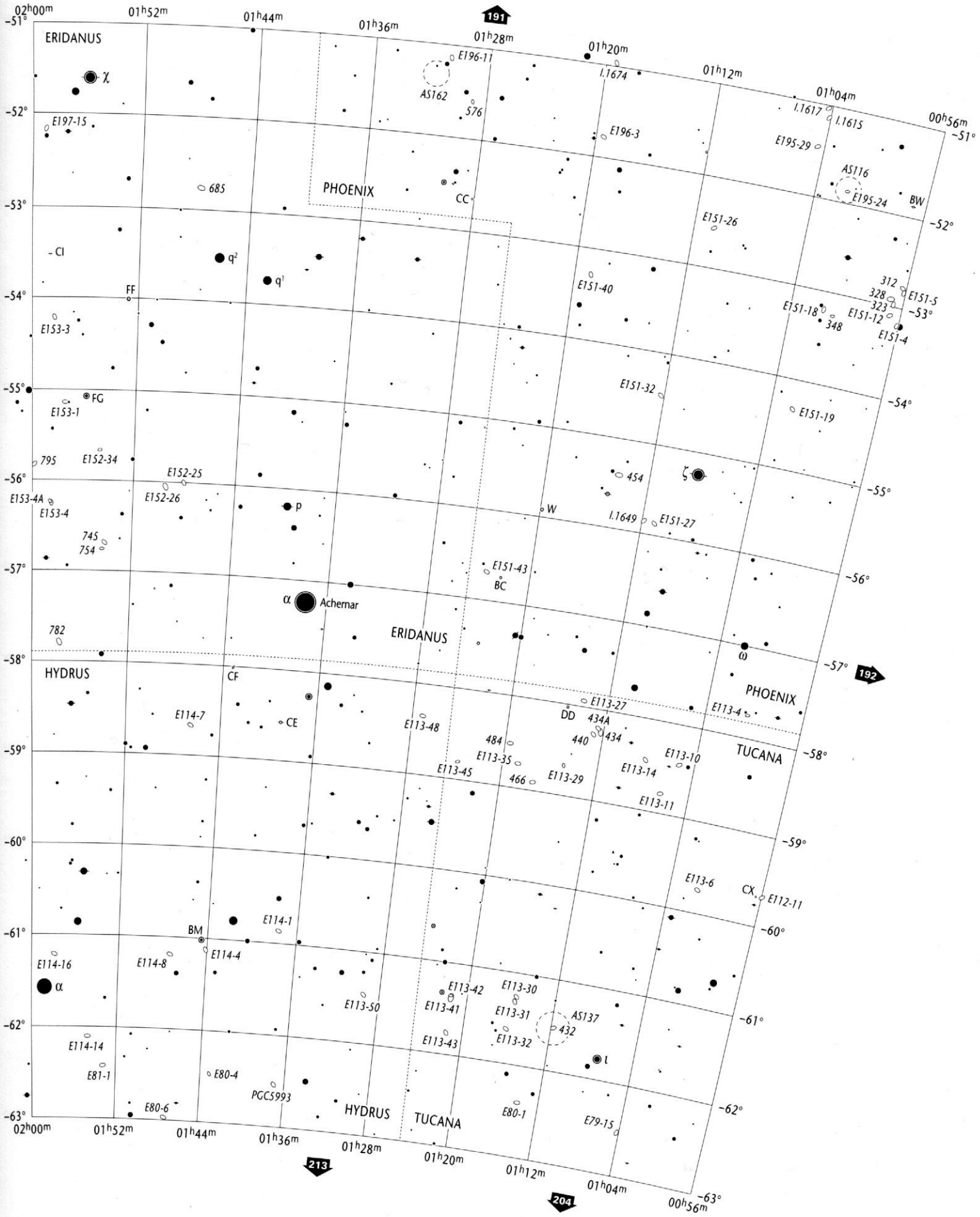
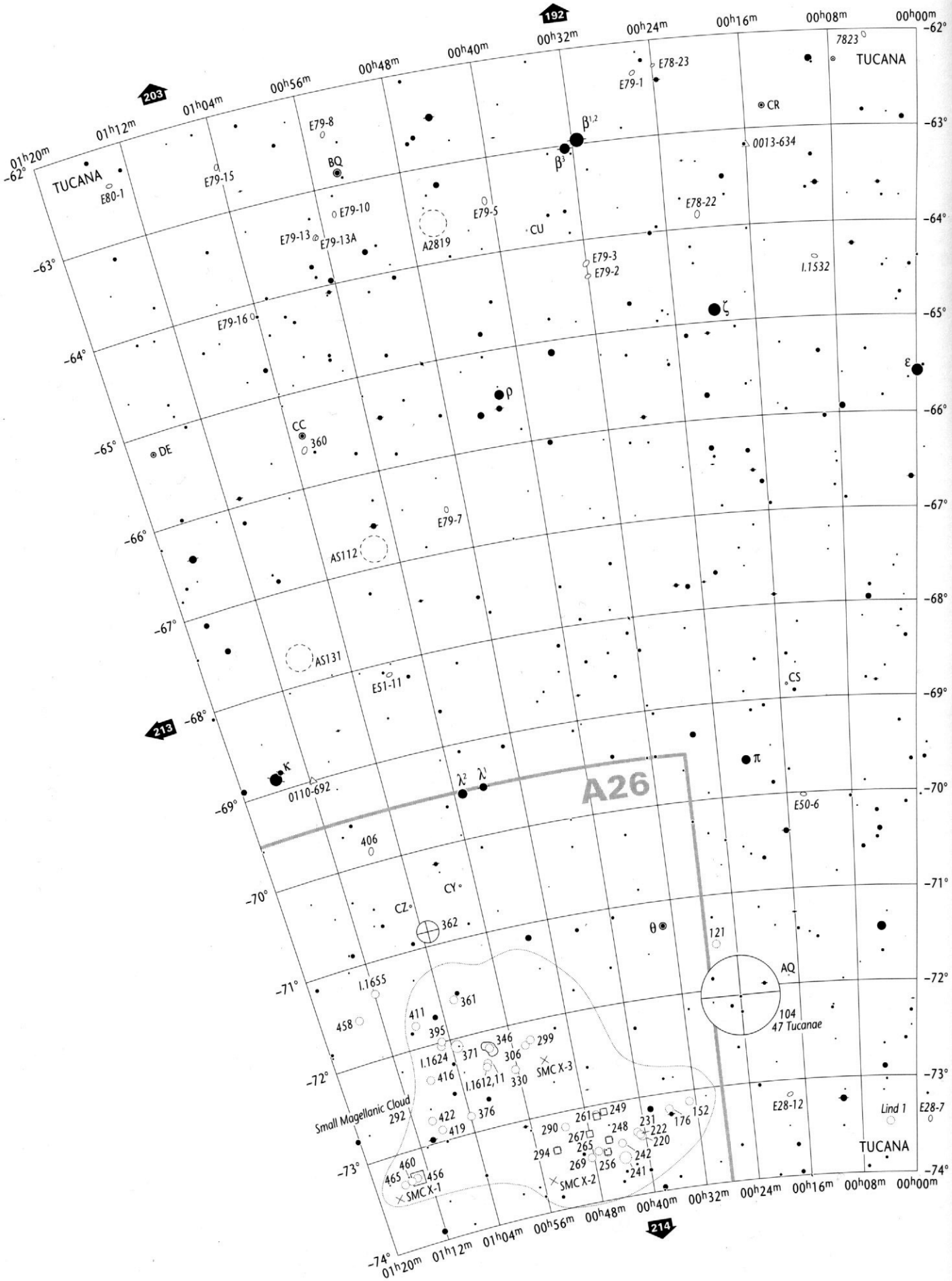


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

00h56m to 03h04m
-51° to -63°

HOR
PHE, HYI, ERI, TUC

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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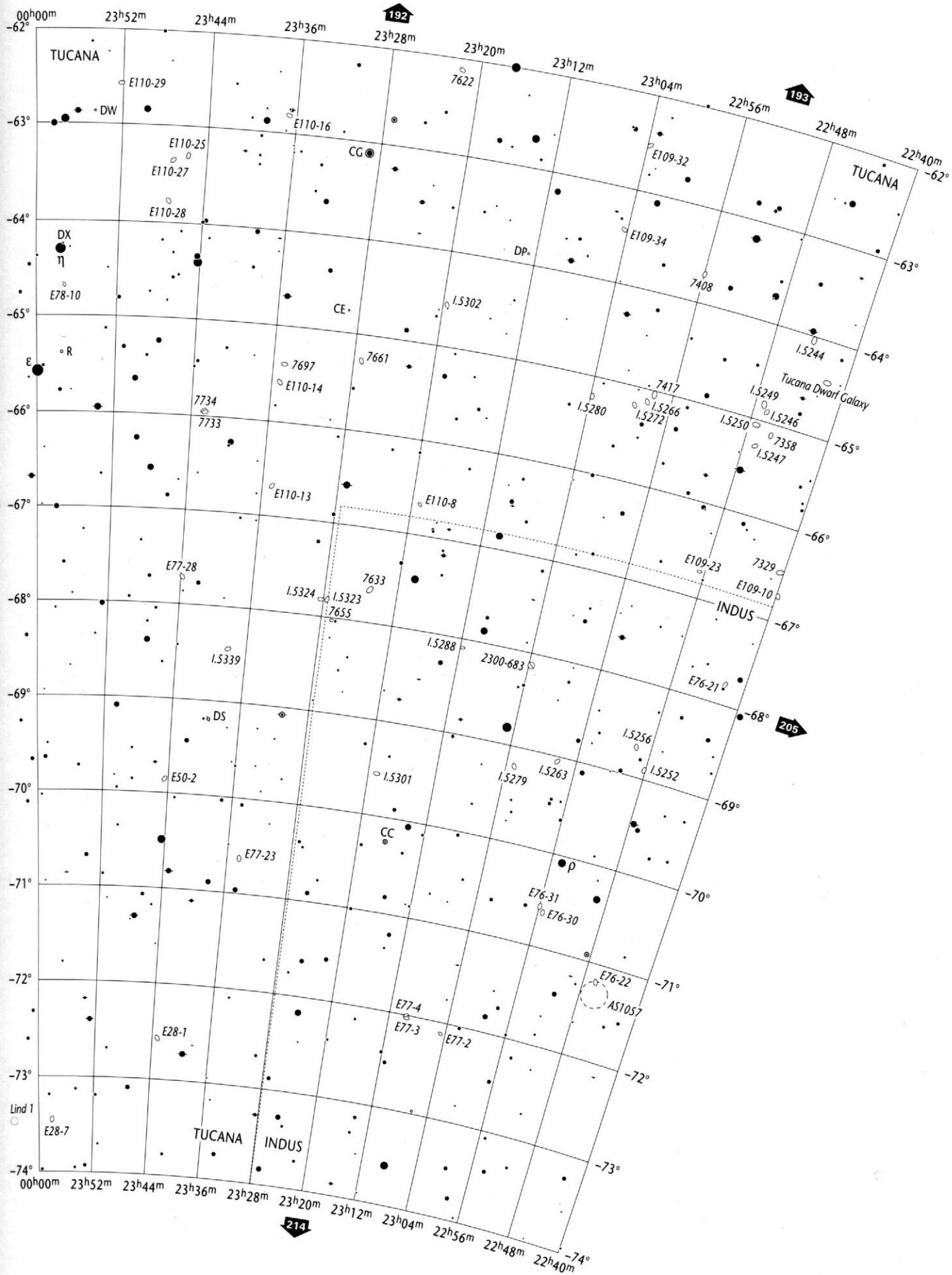
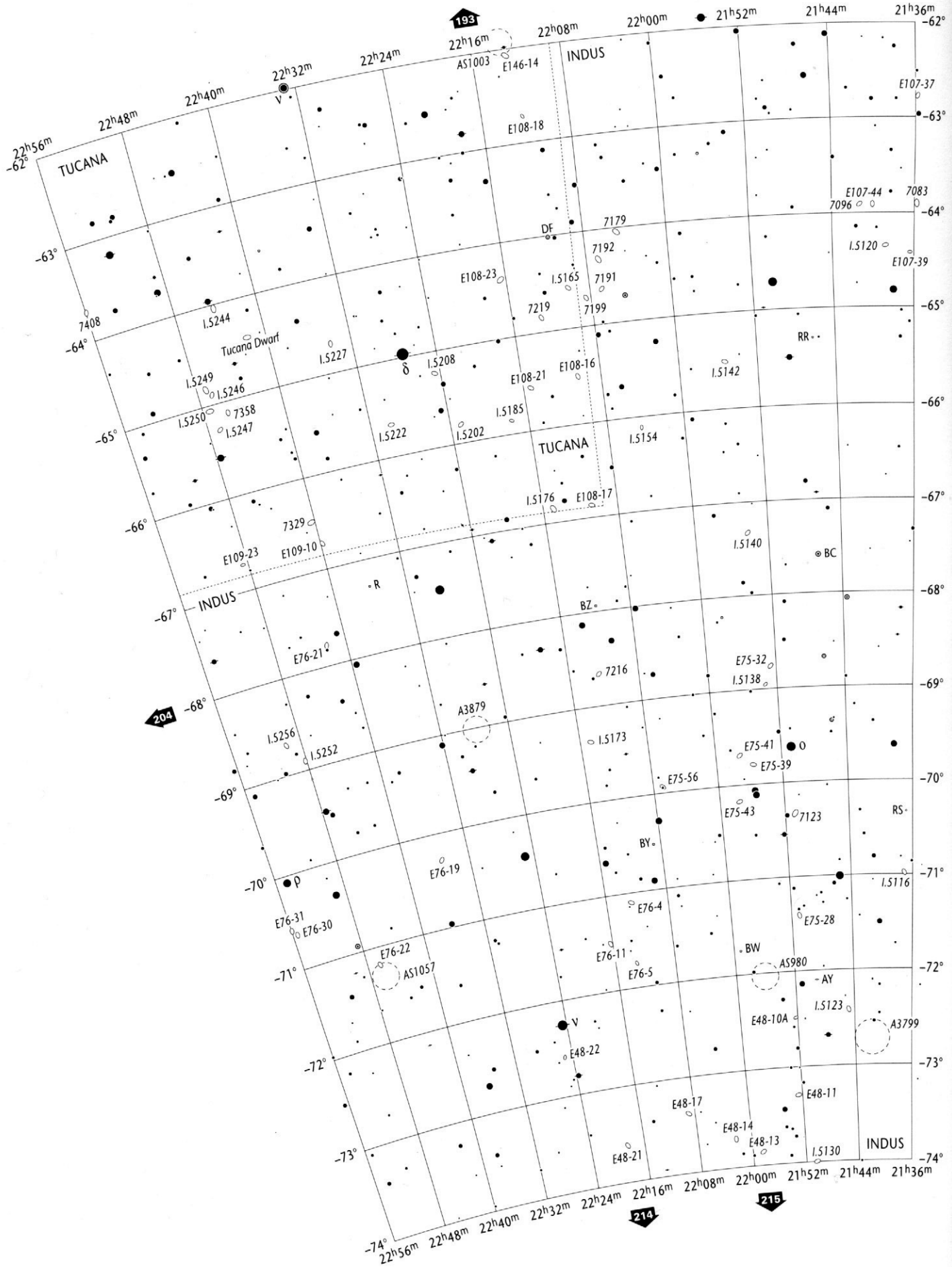


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

01h20m to 22h40m
-62° to -74°

TUC
IND

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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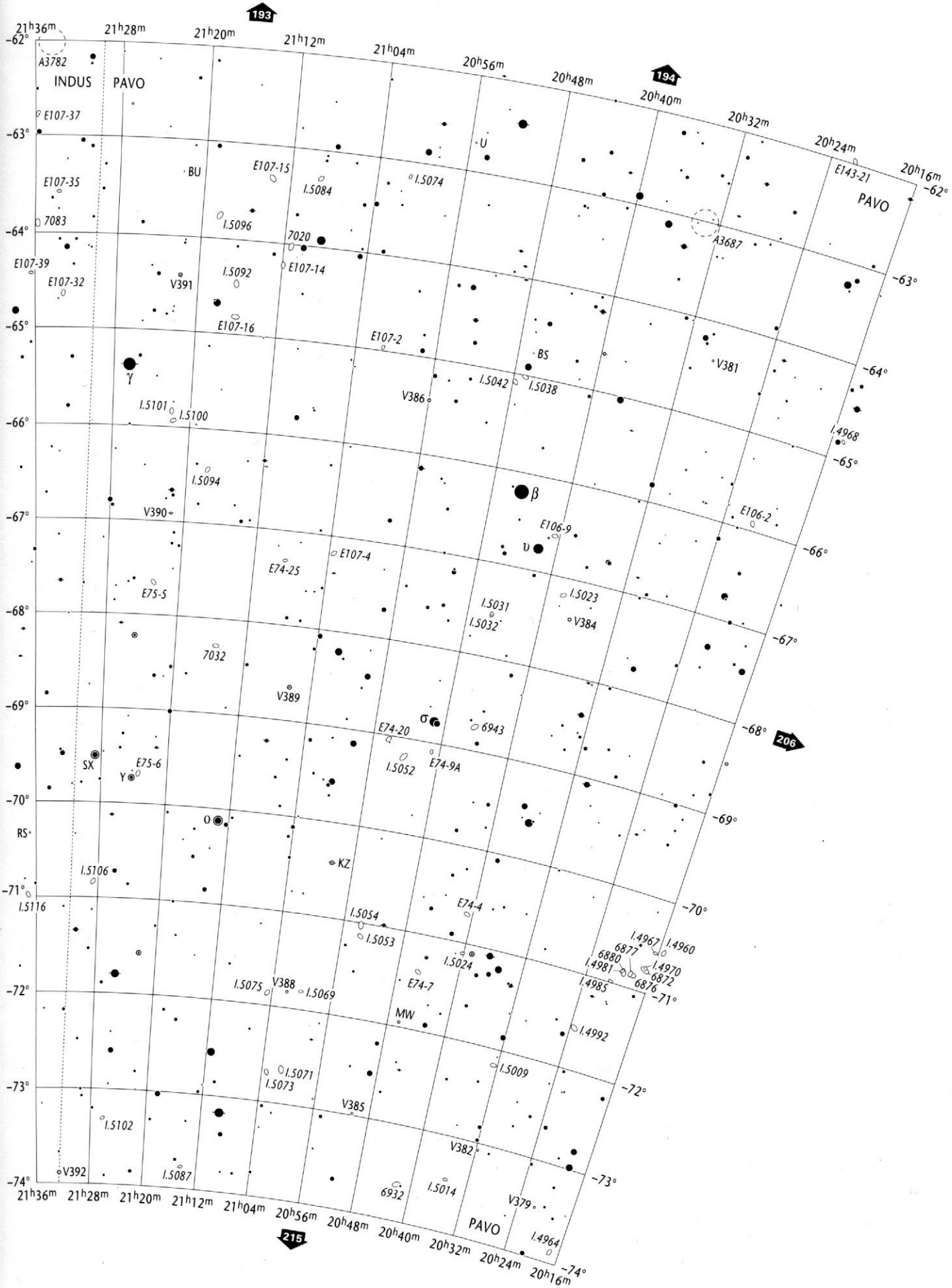
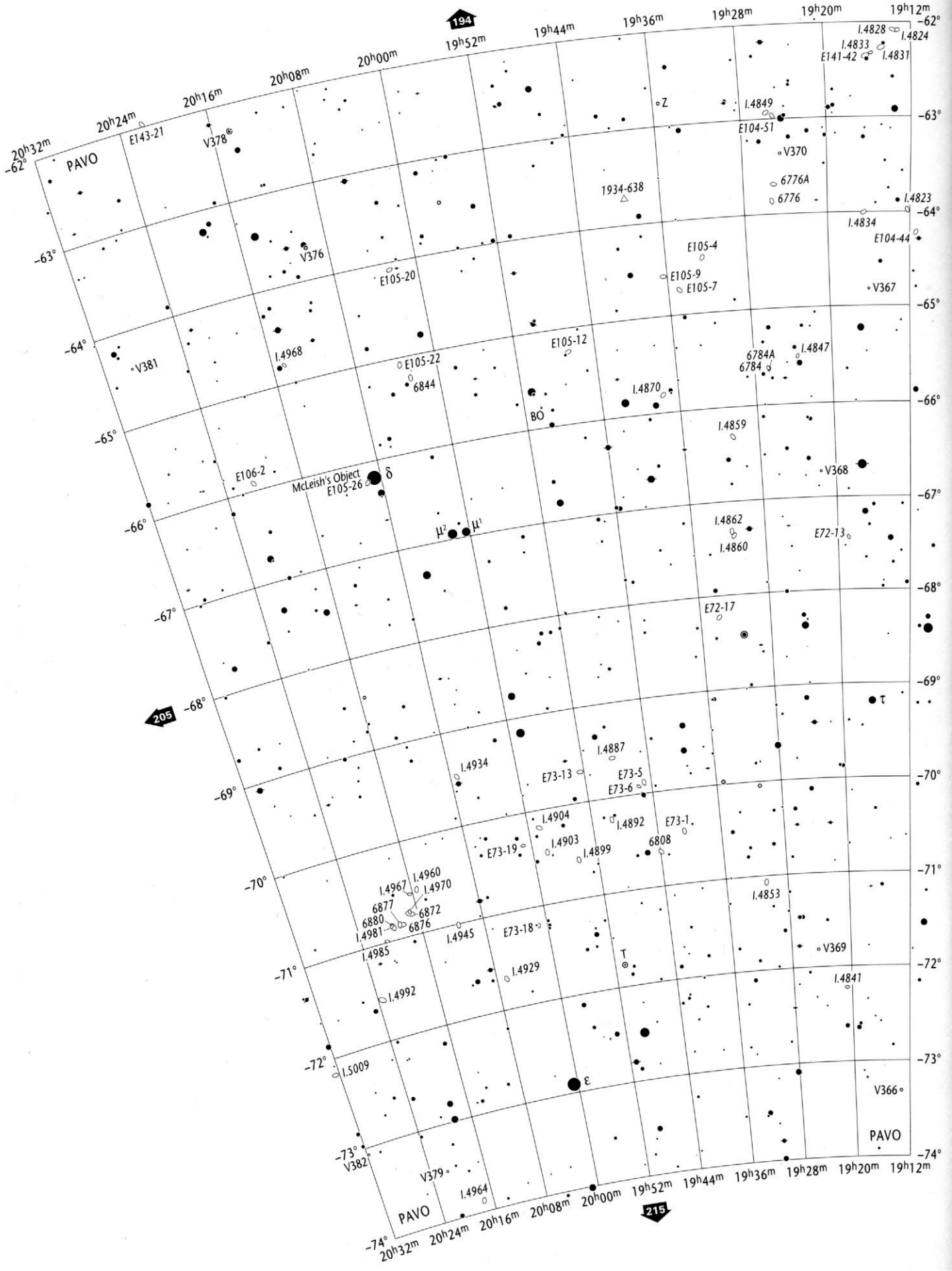


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale	5'-2' 2'-1' < 1' major axis	to scale	**20h16m to 22h56m** **-62° to -74°**	**PAV** **IND, TUC**

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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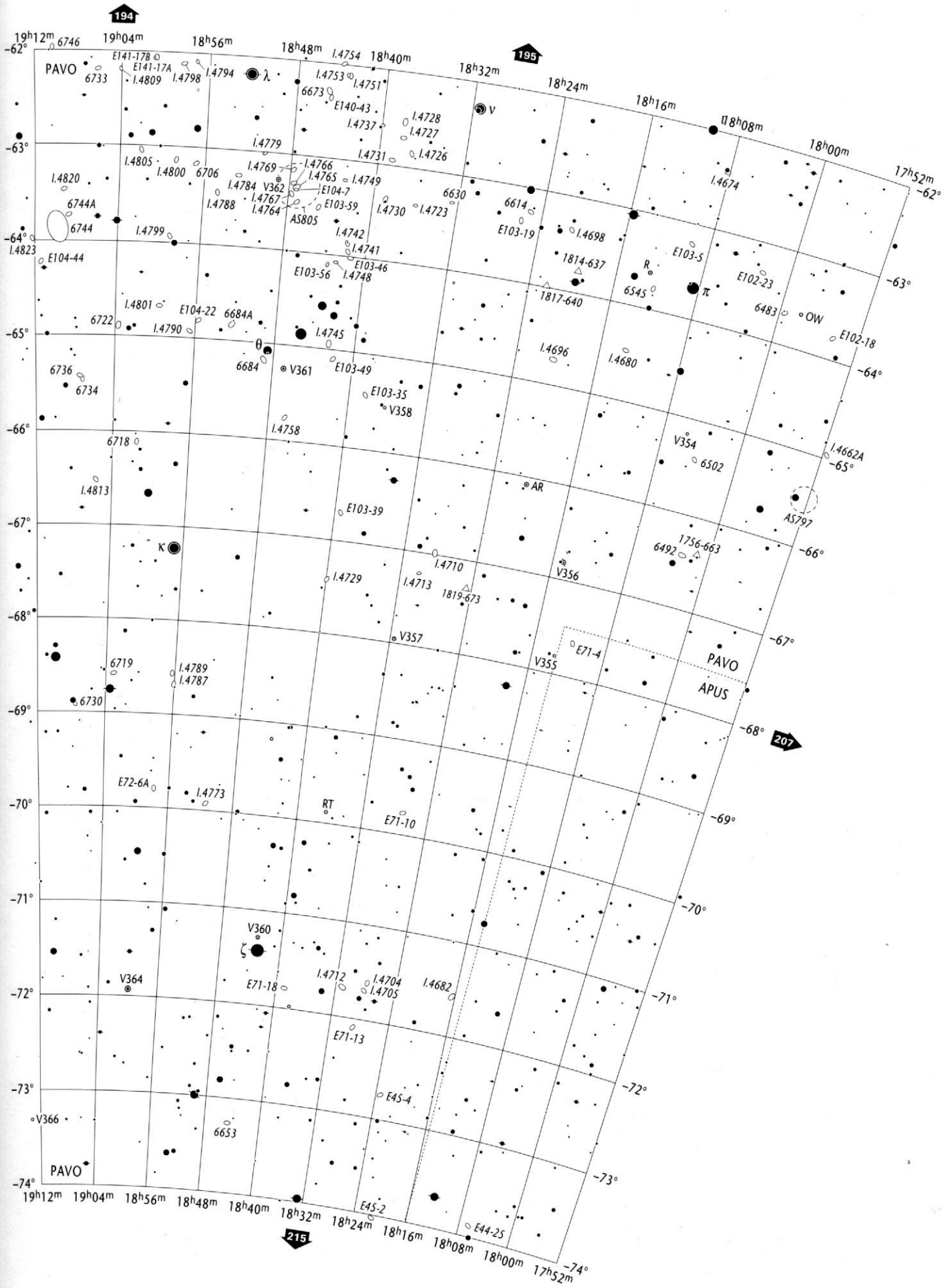
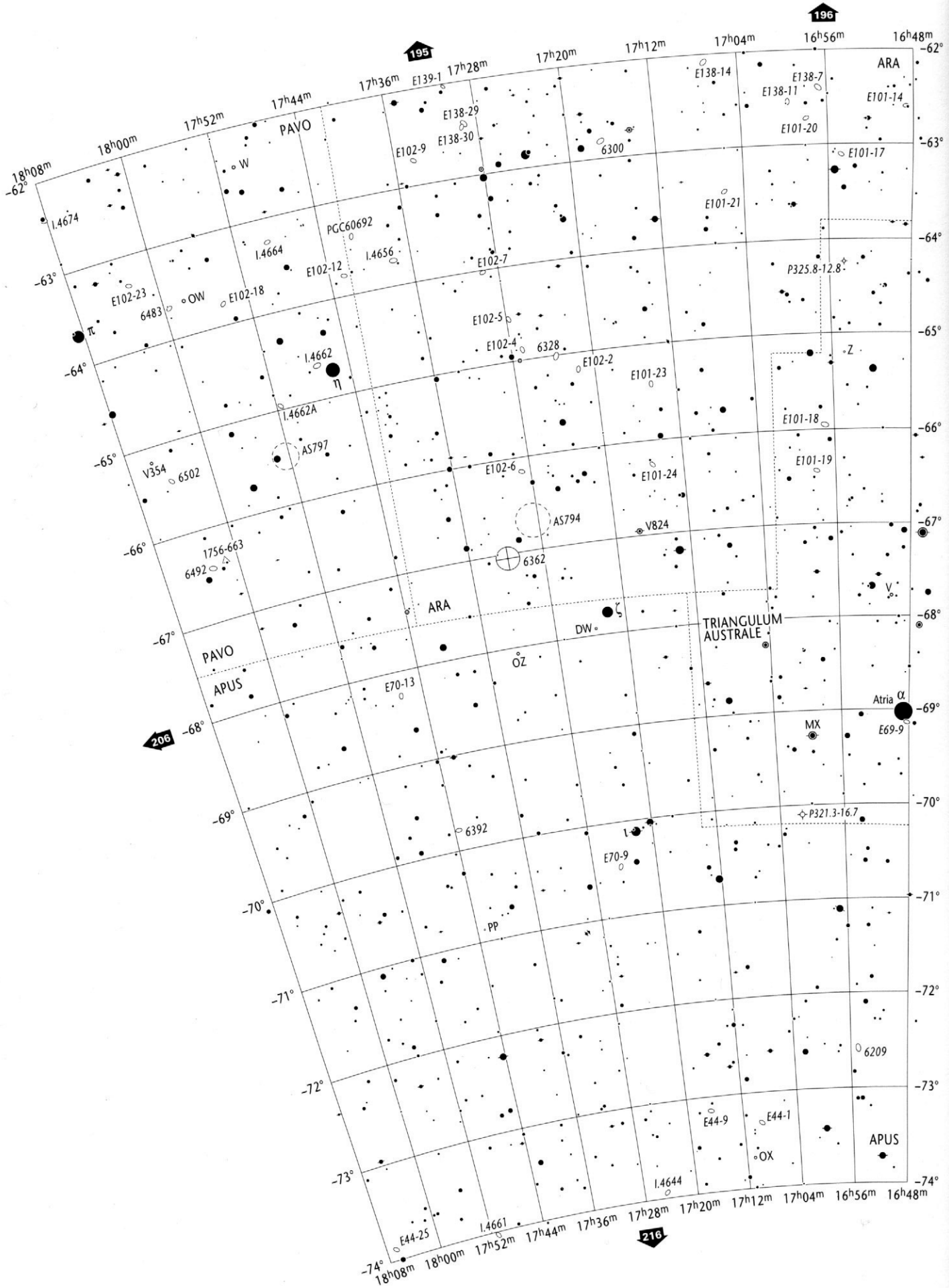


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

17h52m to 20h32m
-62° to -74°

PAV
APS

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60°

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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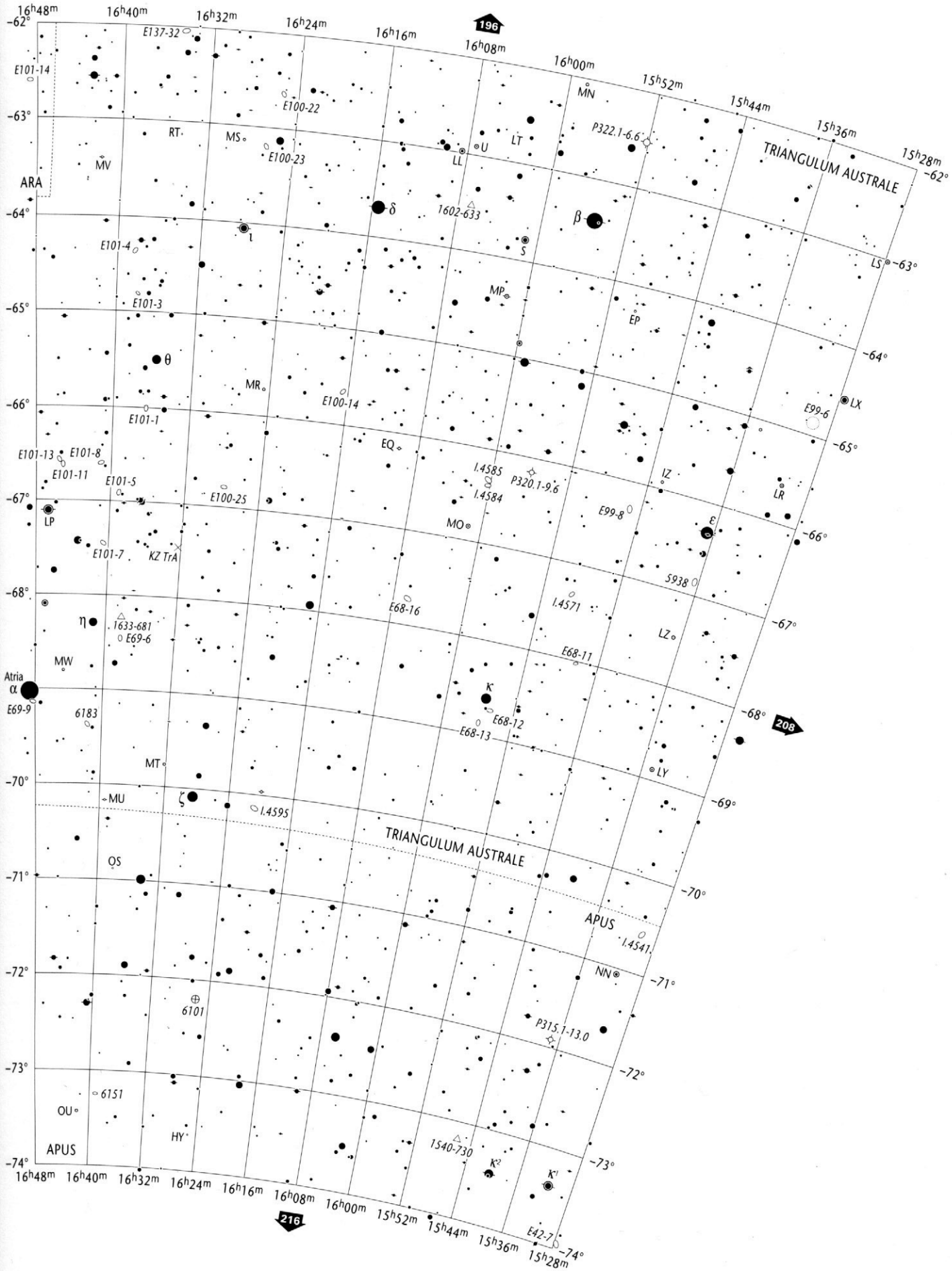
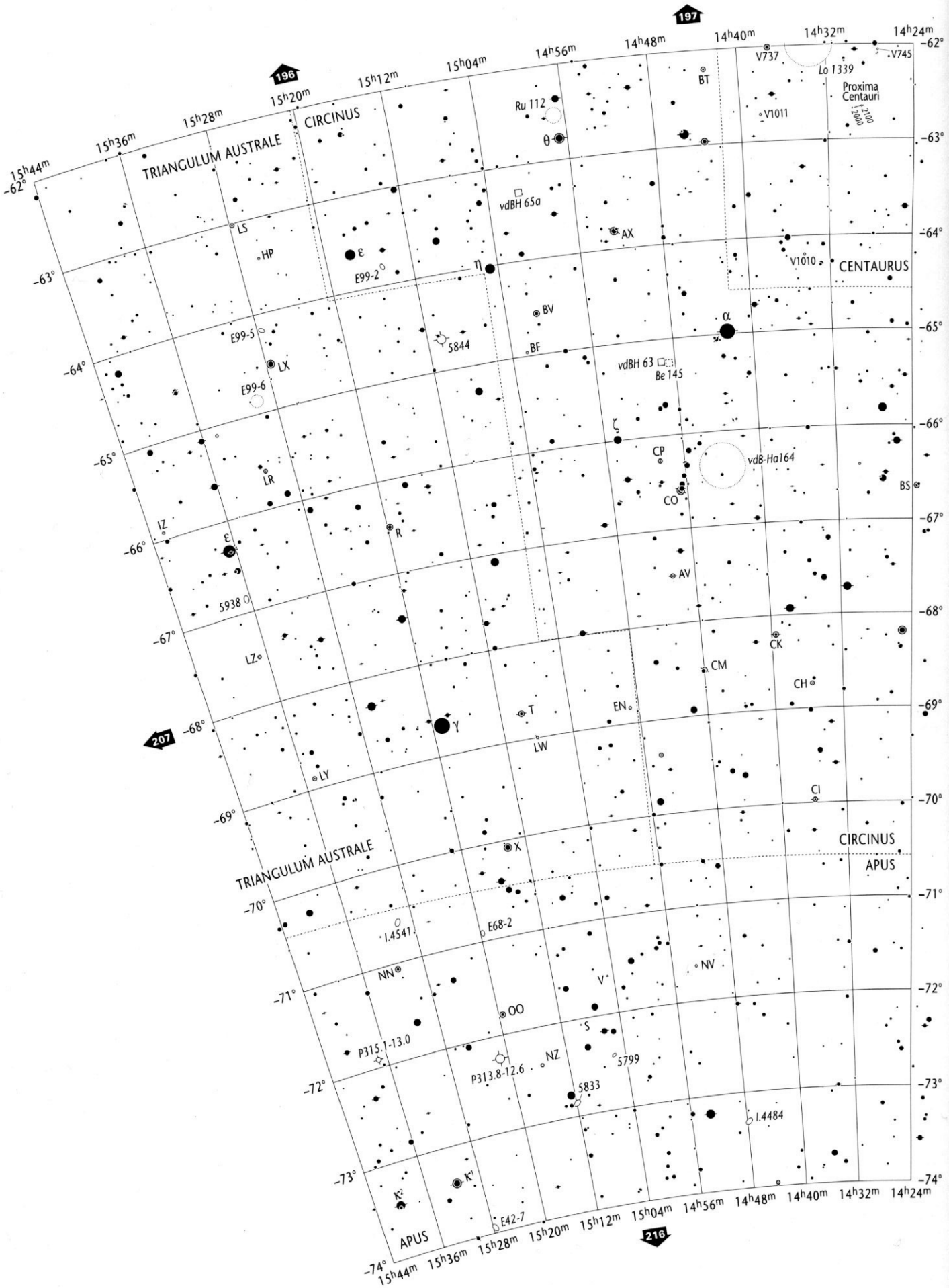


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

15h28m to 18h08m
-62° to -74°

TRA
APS, ARA, PAV

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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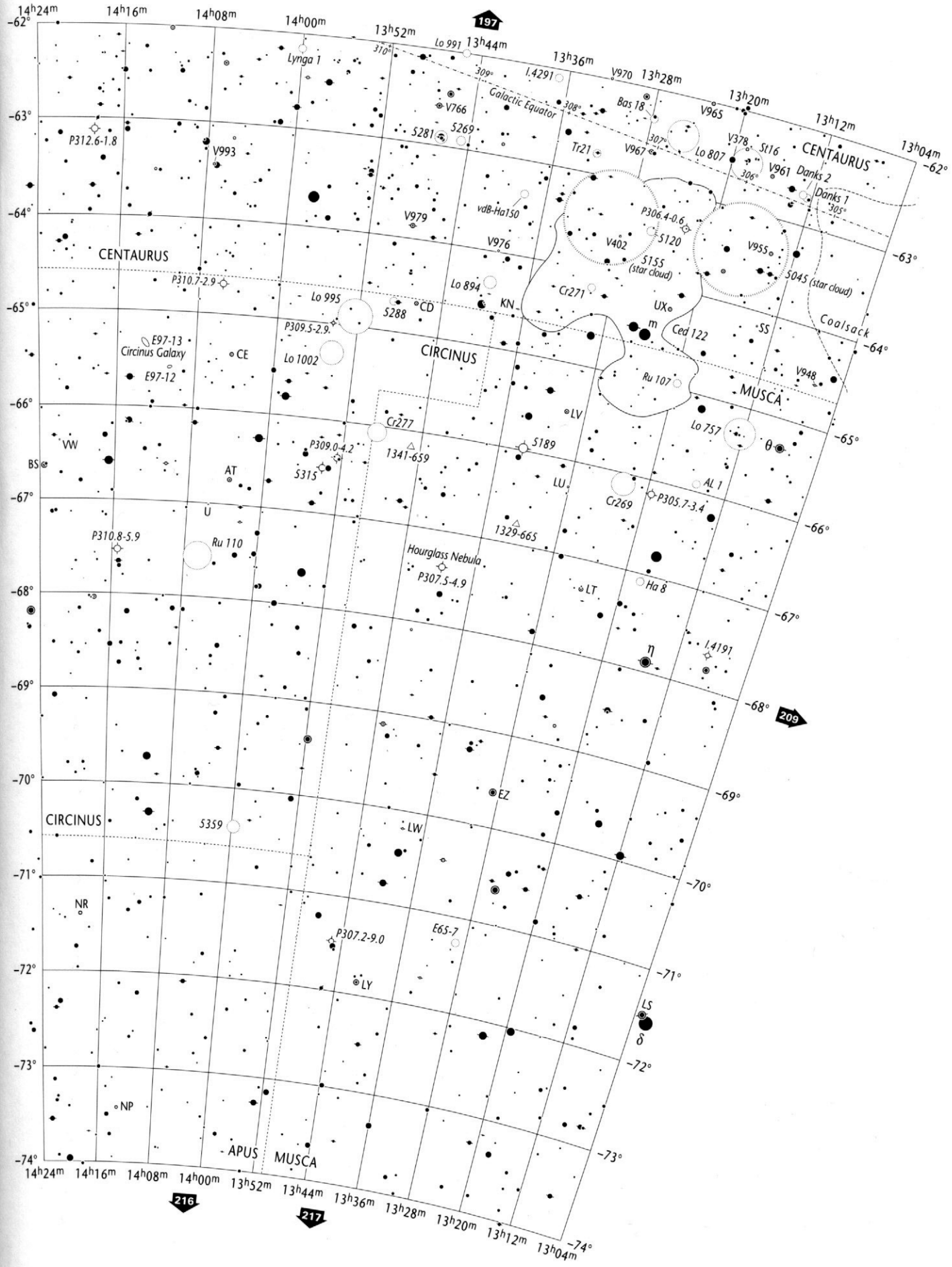
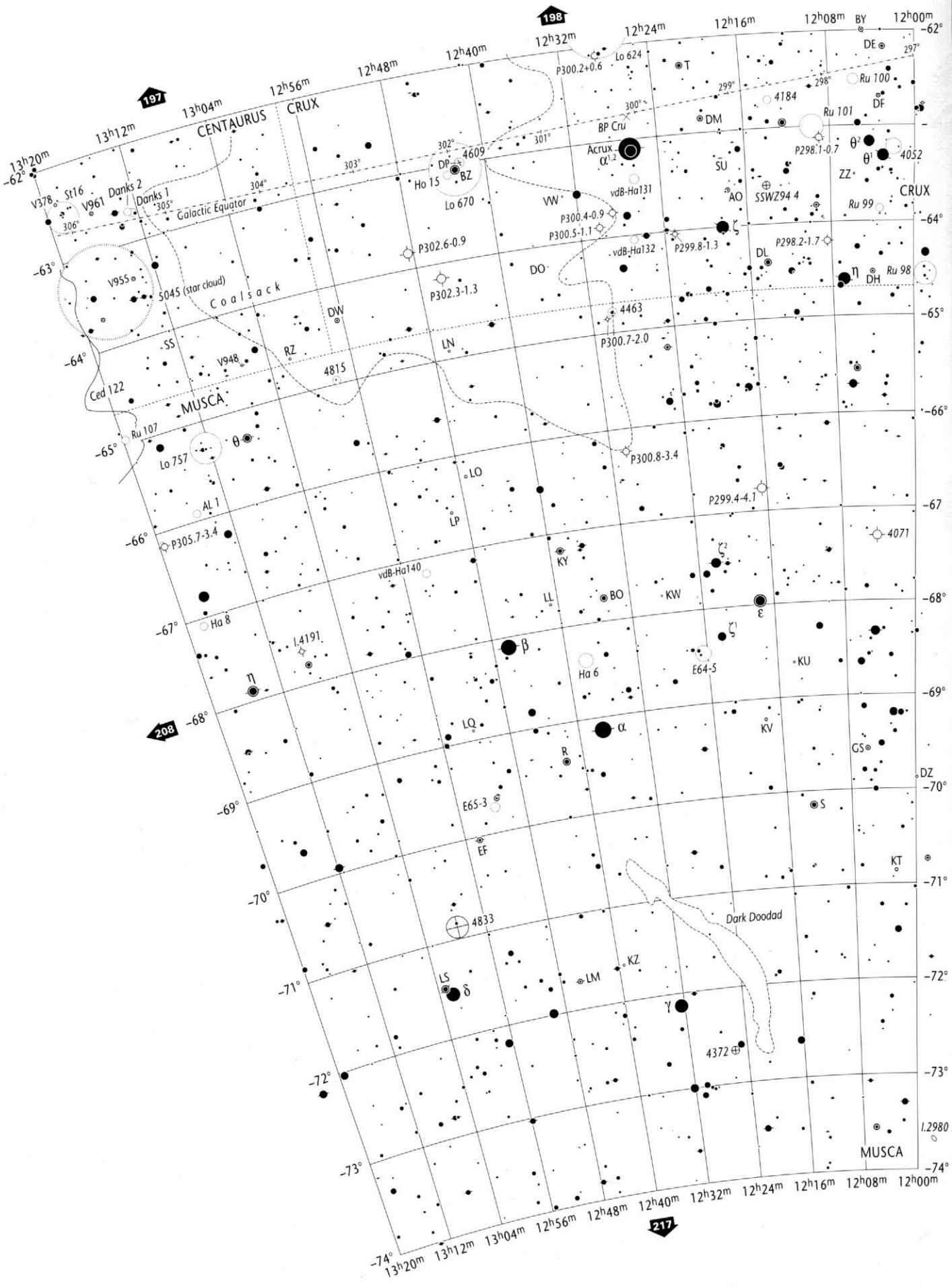


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	13^h04^m to 15^h44^m $-62°$ to $-74°$	CIR MUS, TRA, APS, CEN
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60°

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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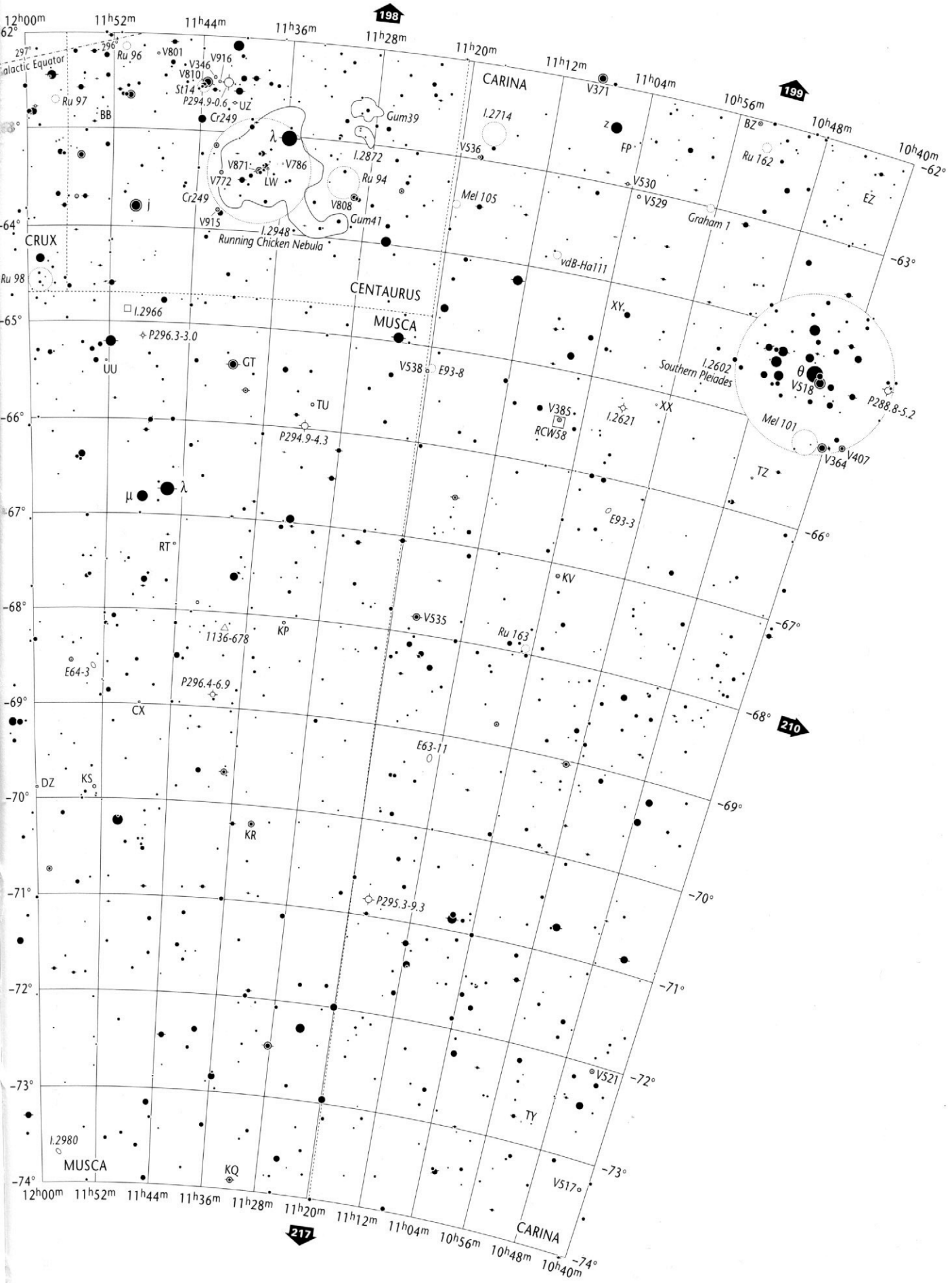
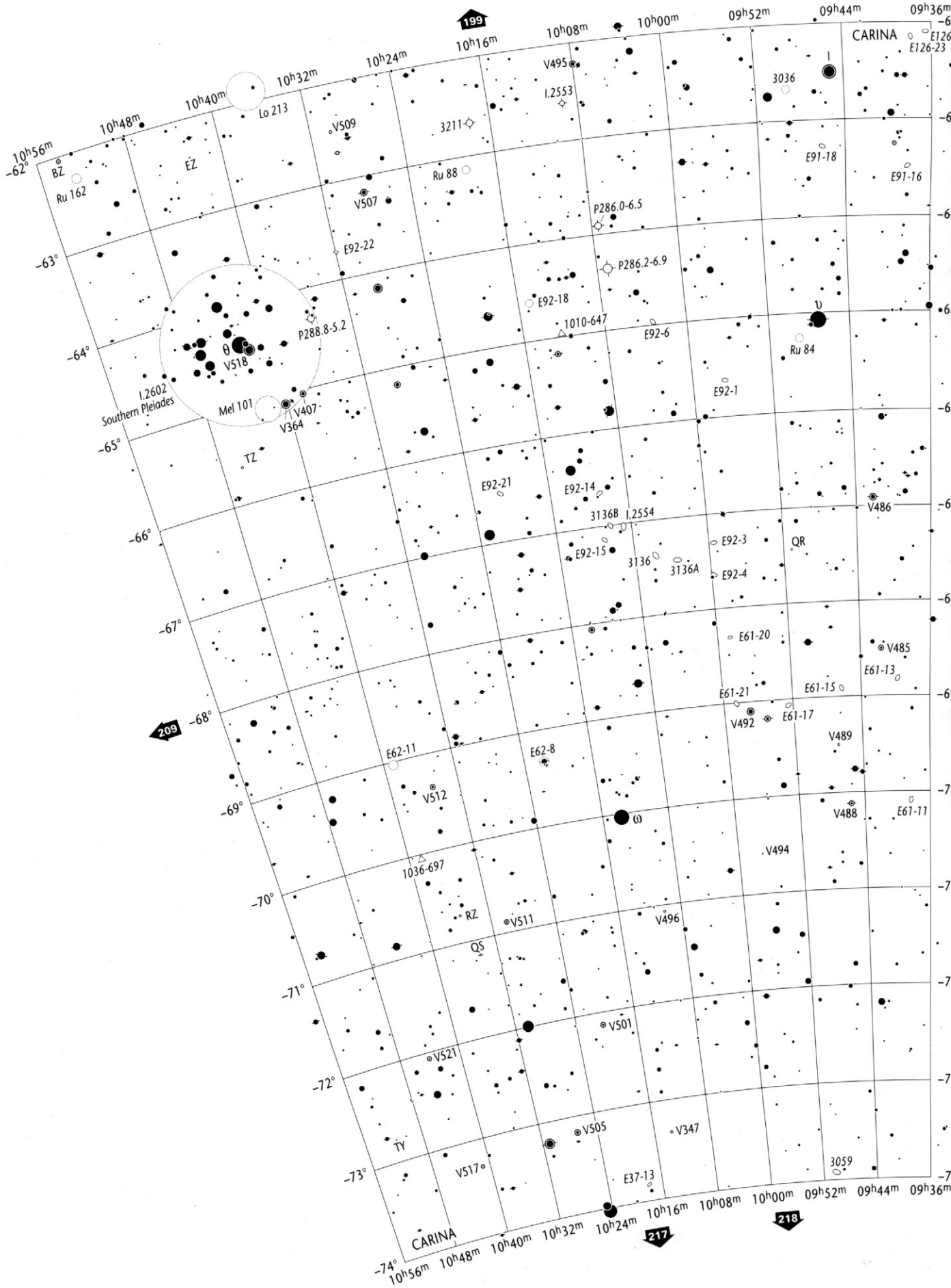


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	10^h40^m to 13^h20^m $-62°$ to $-74°$	MUS CAR, CRU, CEN
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale		

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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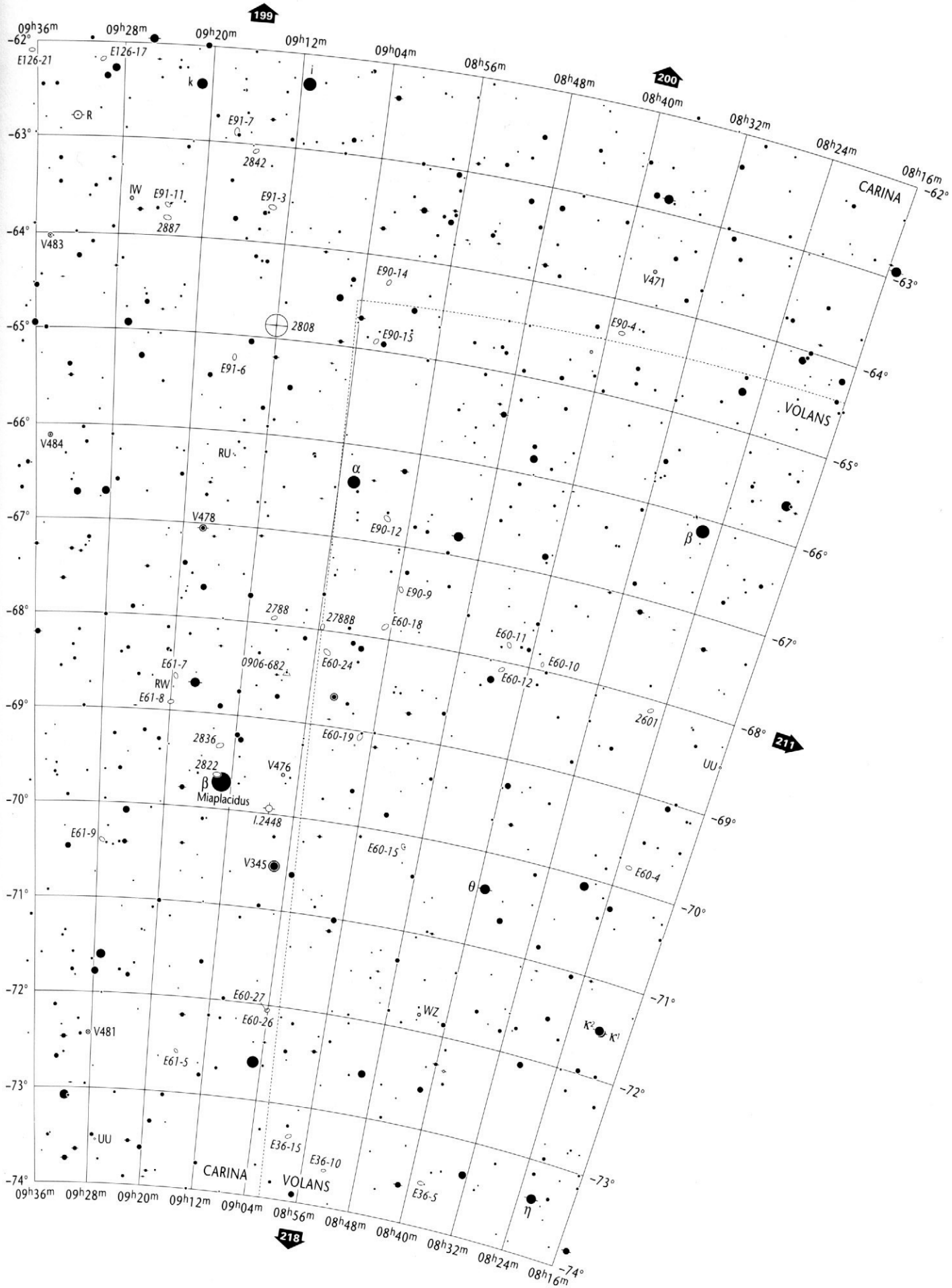
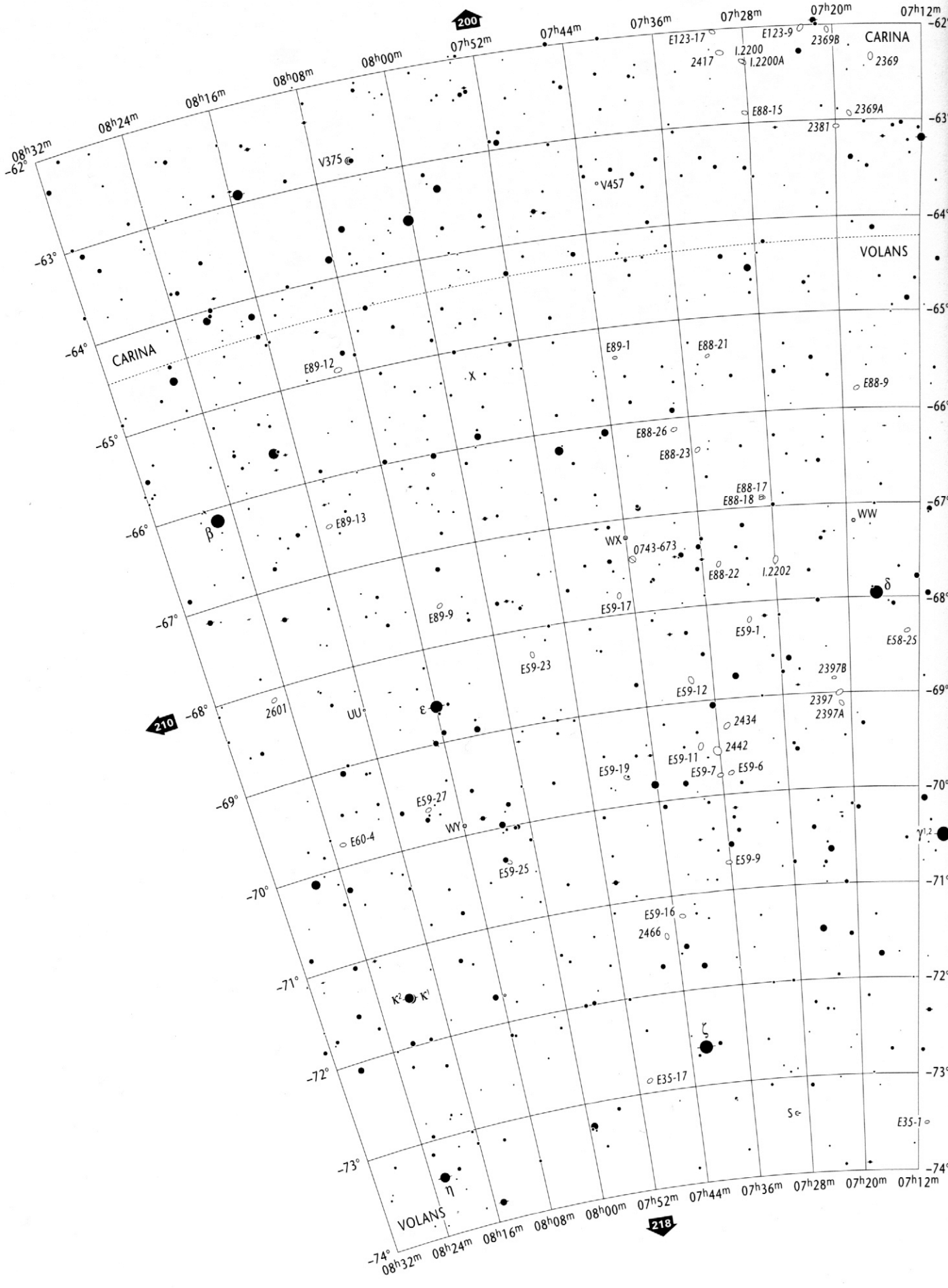


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

08h16m to 10h56m
-62° to -74°

CAR
VOL

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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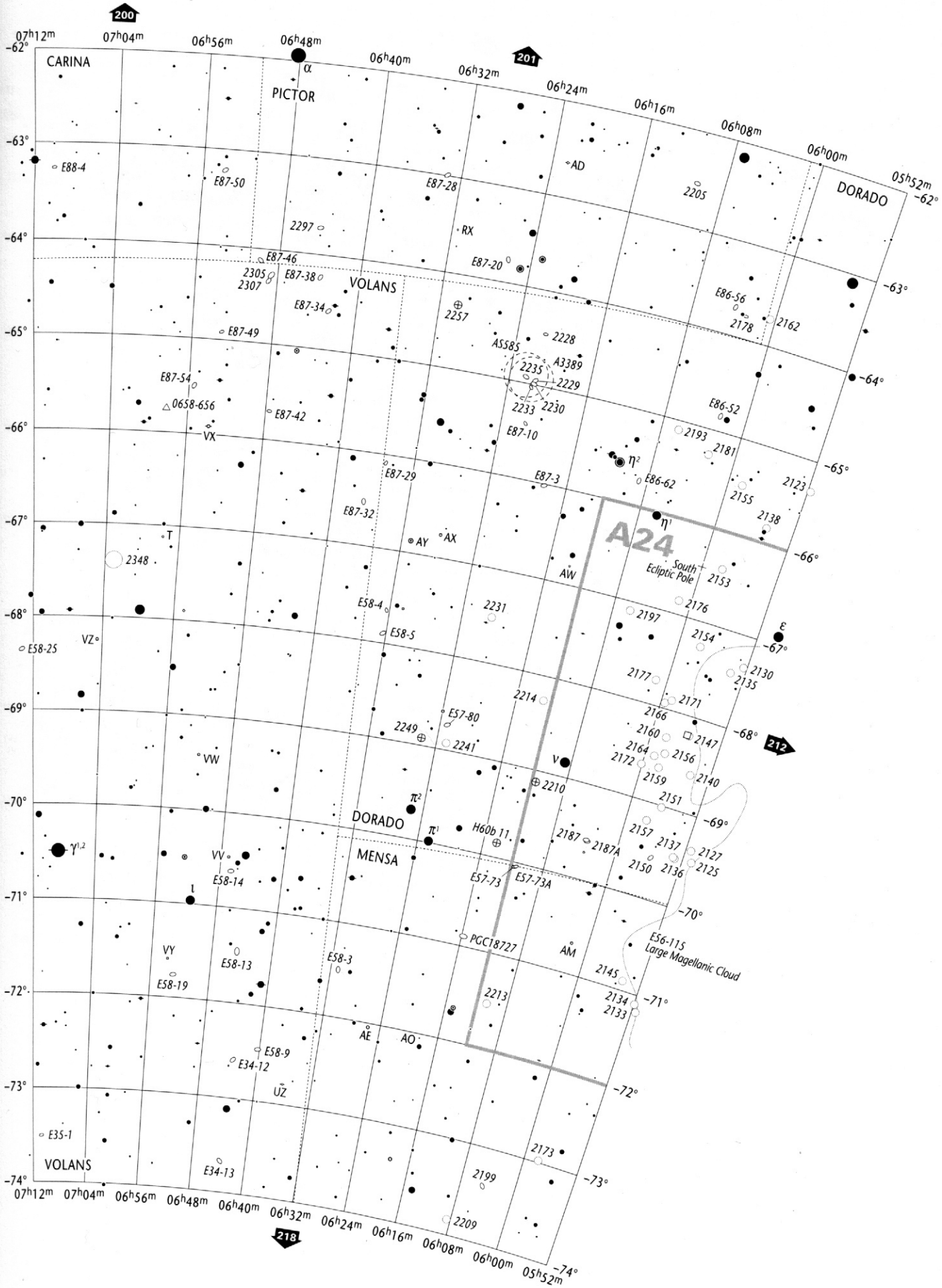
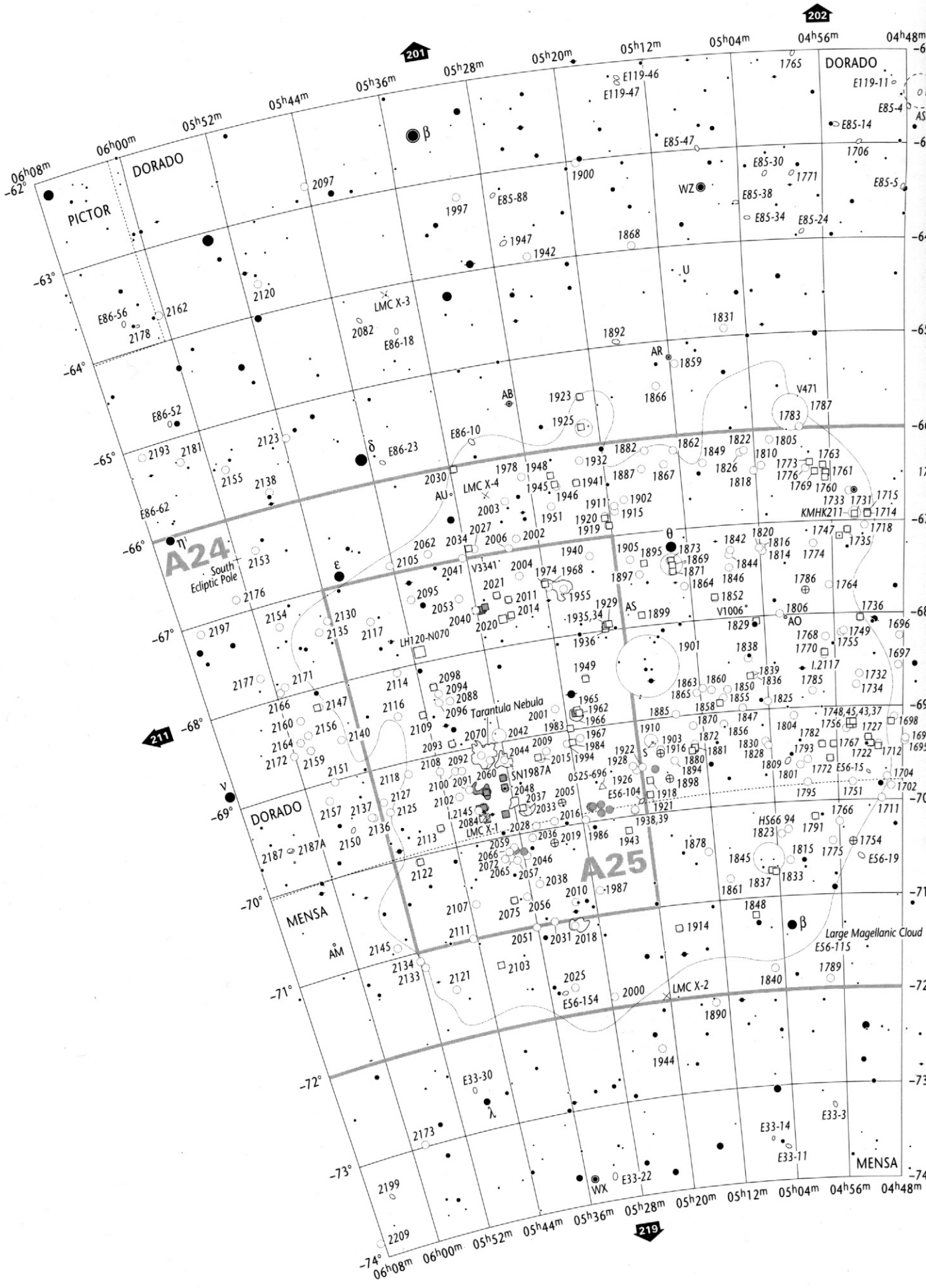


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale 5'-2' 2'-1' < 1' major axis	to scale	**05h52m to 08h32m** **-62° to -74°**	**VOL** DOR, CAR, MEN, PIC

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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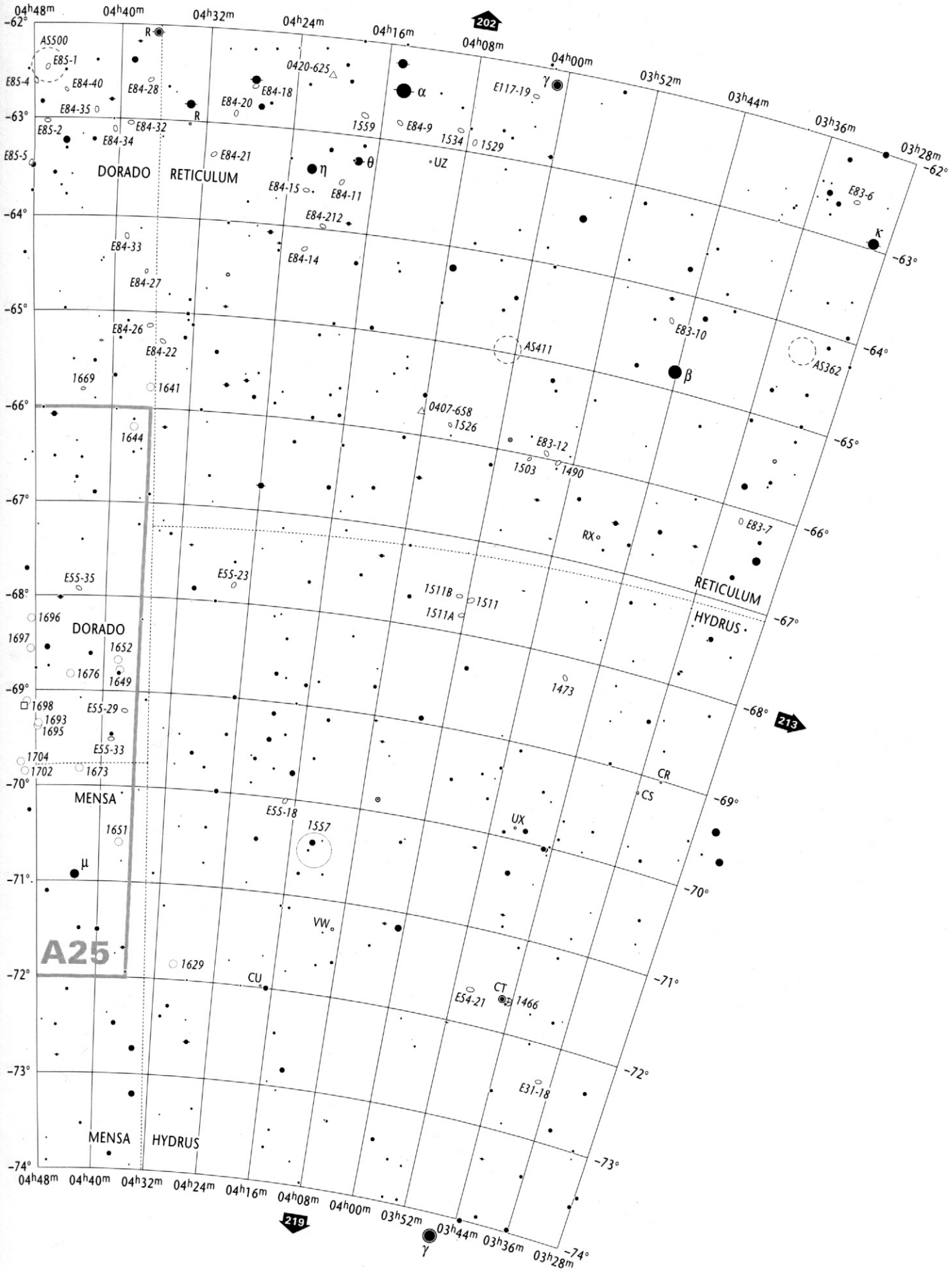
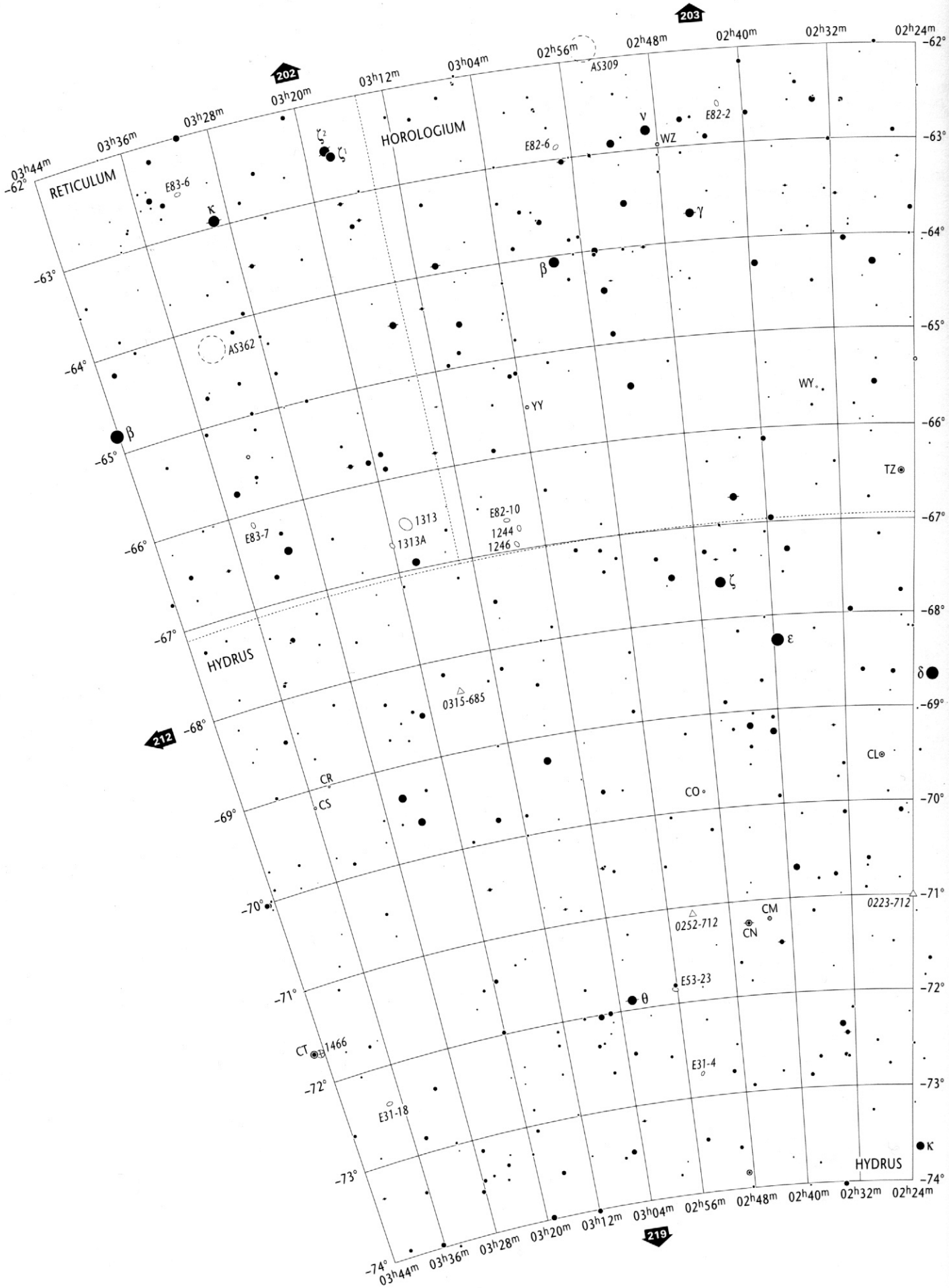


03h28m to 06h08m
-62° to -74°

DOR
RET, HYI, MEN, PIC

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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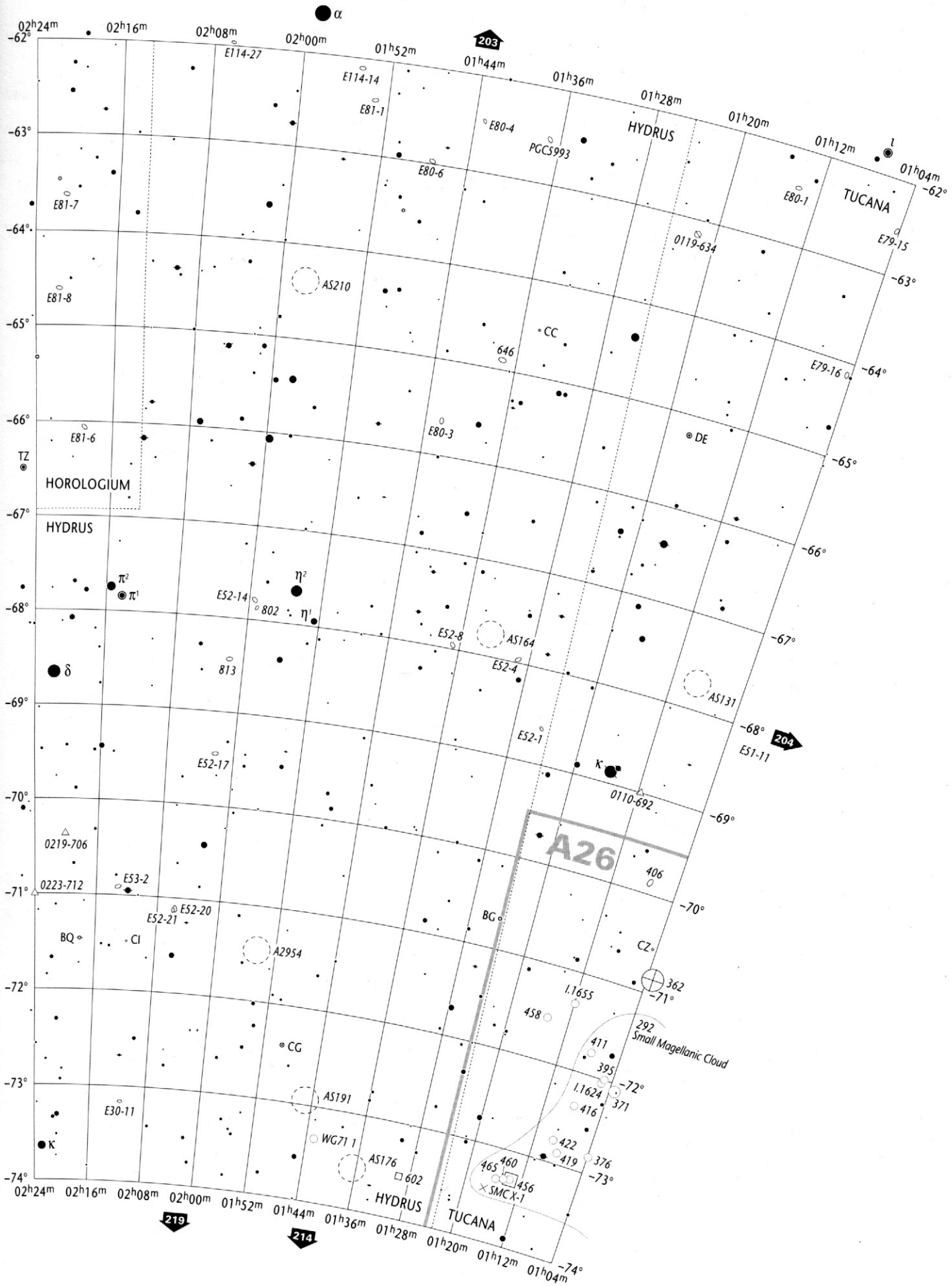
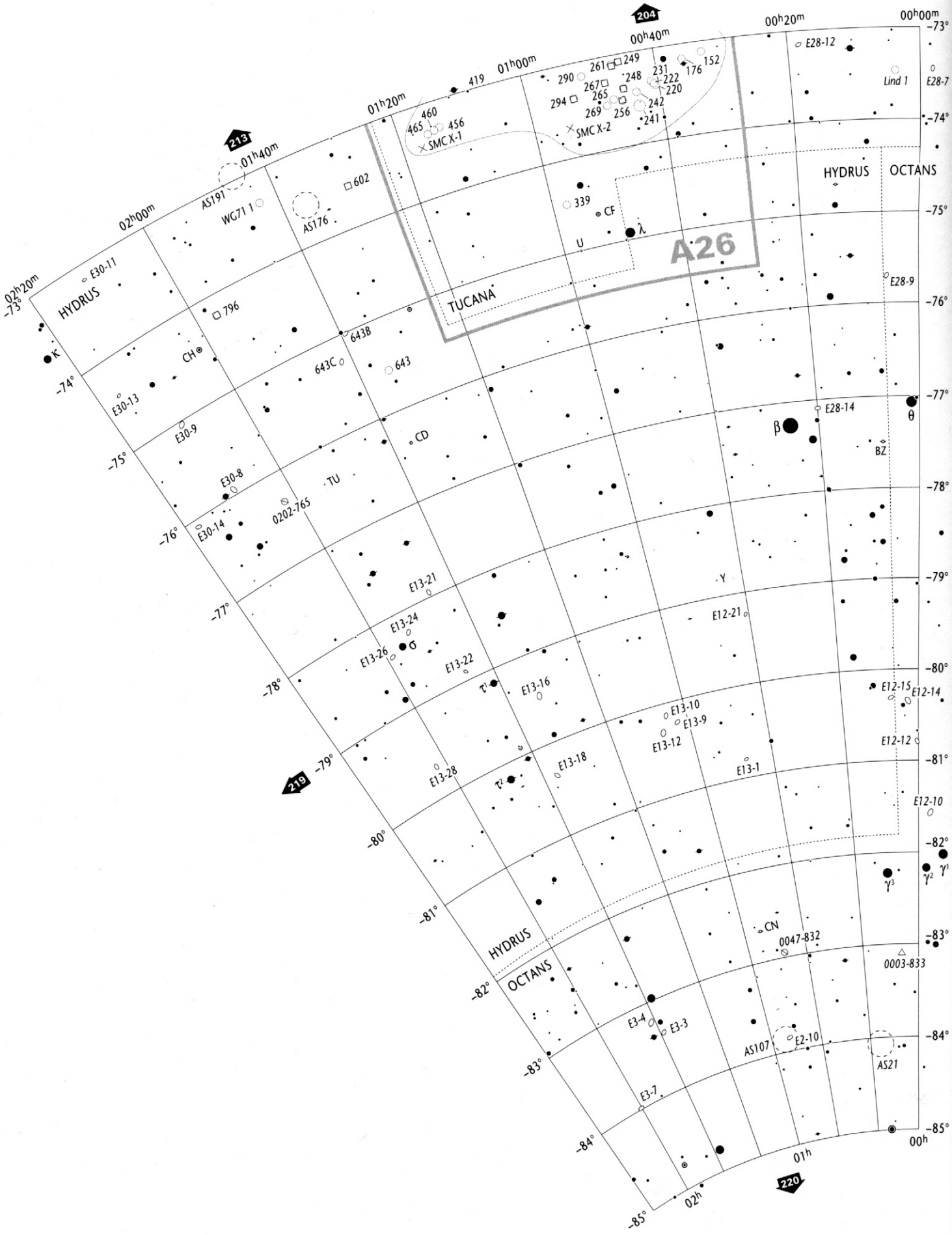


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale · < 5'	to scale · < 5'	>30" · 30"-10" · 10"-5" · < 5"	to scale · 10' - 5' · < 5'	> 5' to scale · 5'-2' · 2'-1' · < 1' major axis	to scale

01h04m to 03h44m
-62° to -74°

HYI
HOR, TUC, RET

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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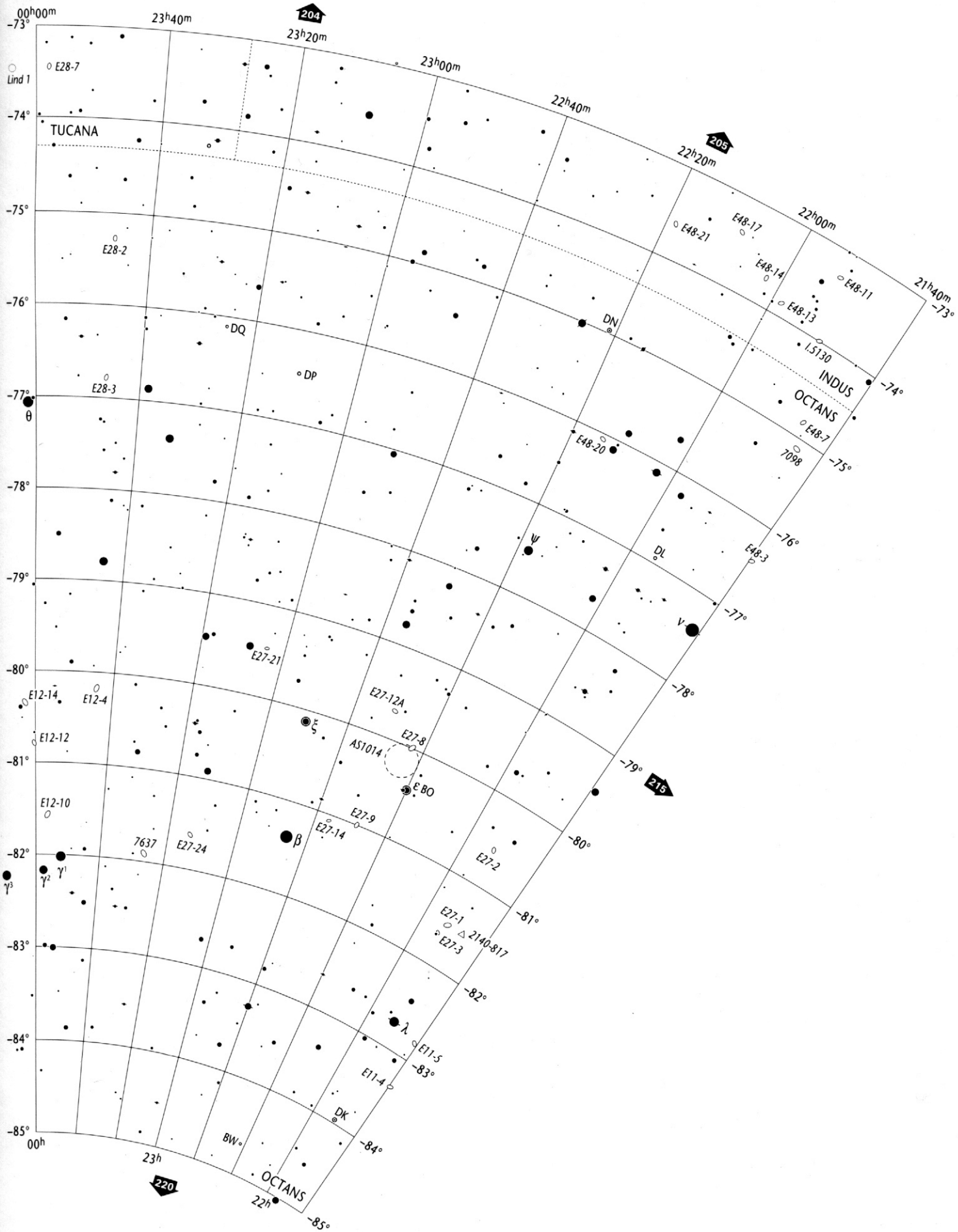
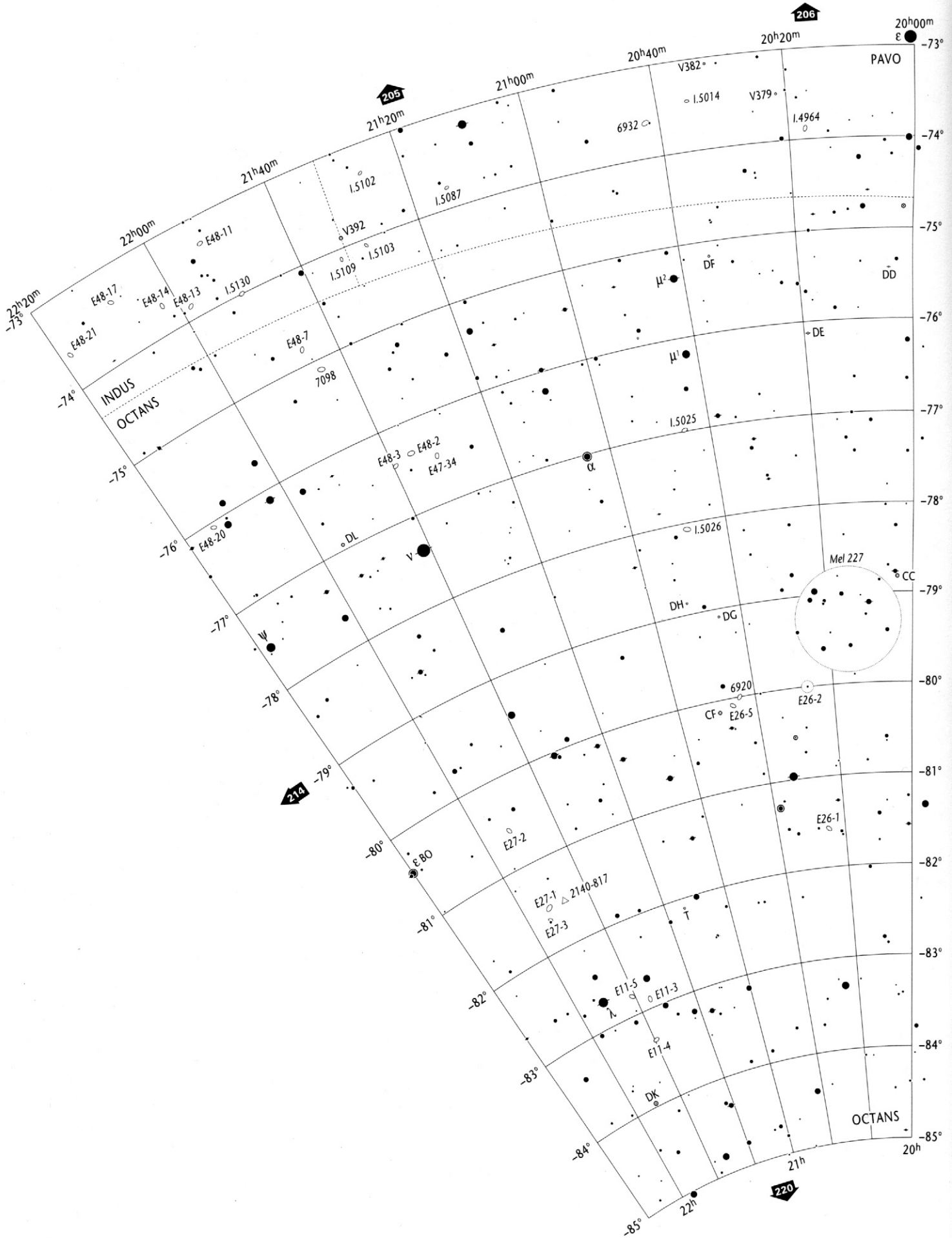


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' <5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

02h20m to 21h40m
-73° to -85°

OCT
HYI, TUC, IND

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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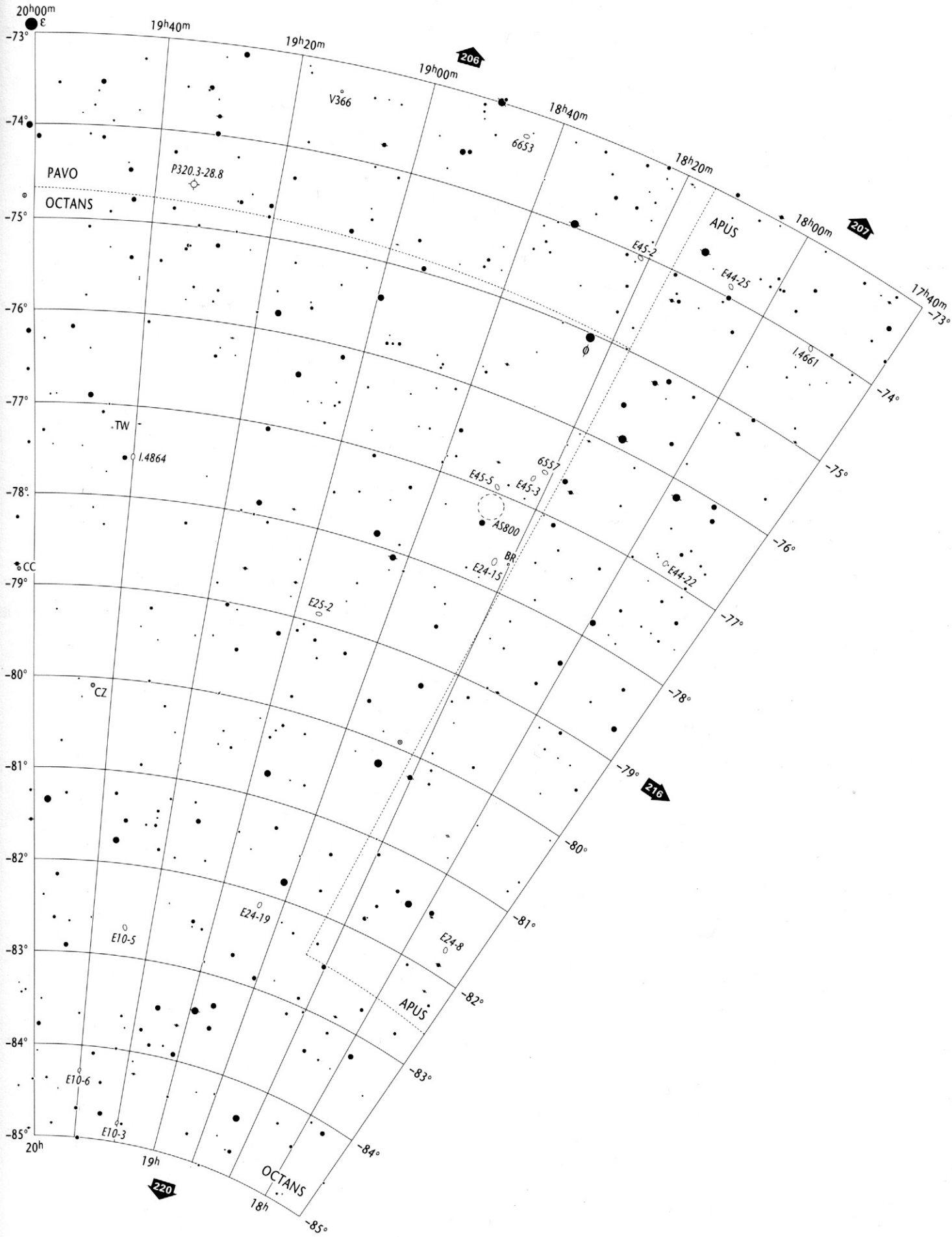
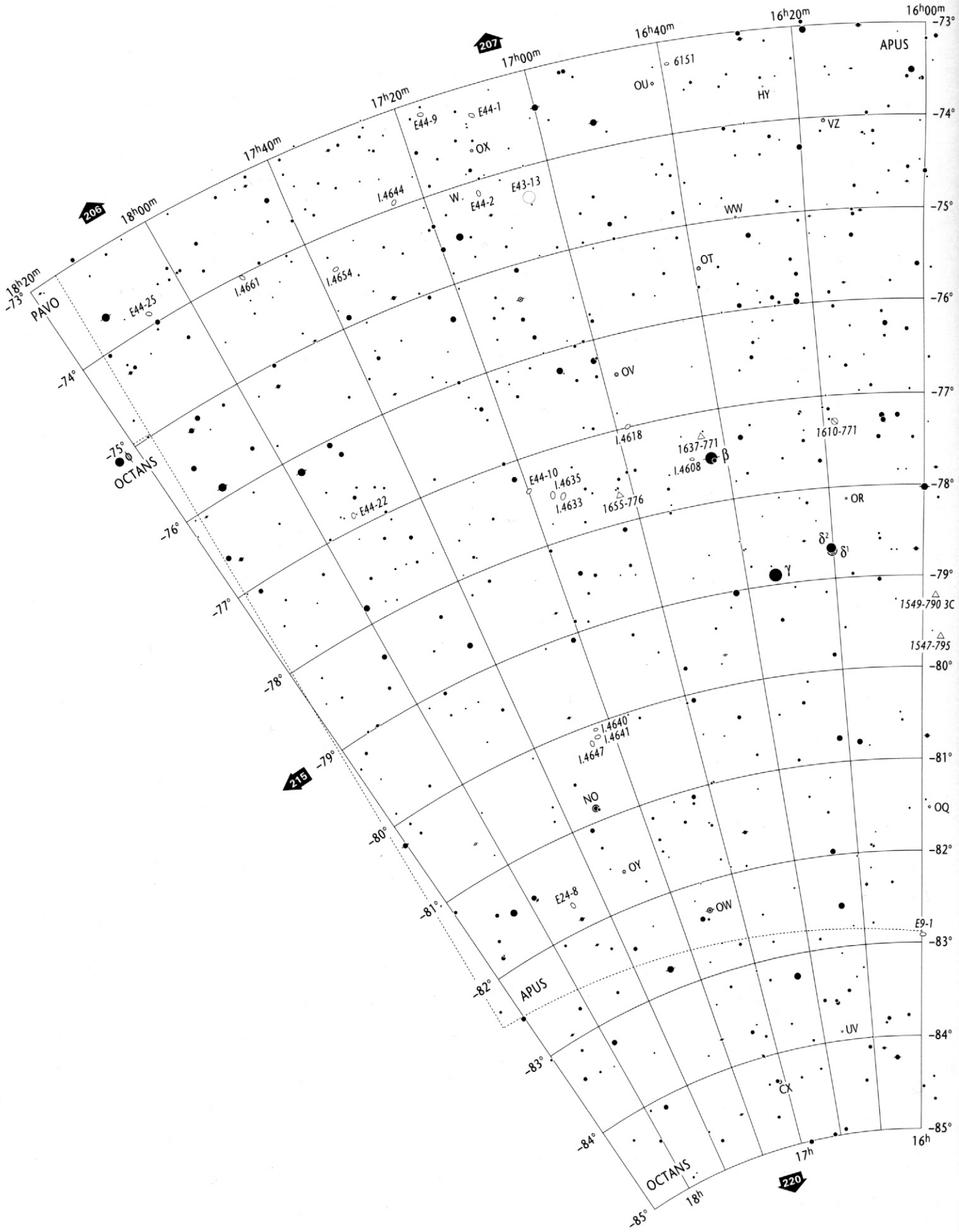


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" <5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

17h40m to 22h20m
-73° to -85°

OCT
PAV, APS, IND

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less — Amplitude 2.0 mag. — Amplitude 3.0 mag. — Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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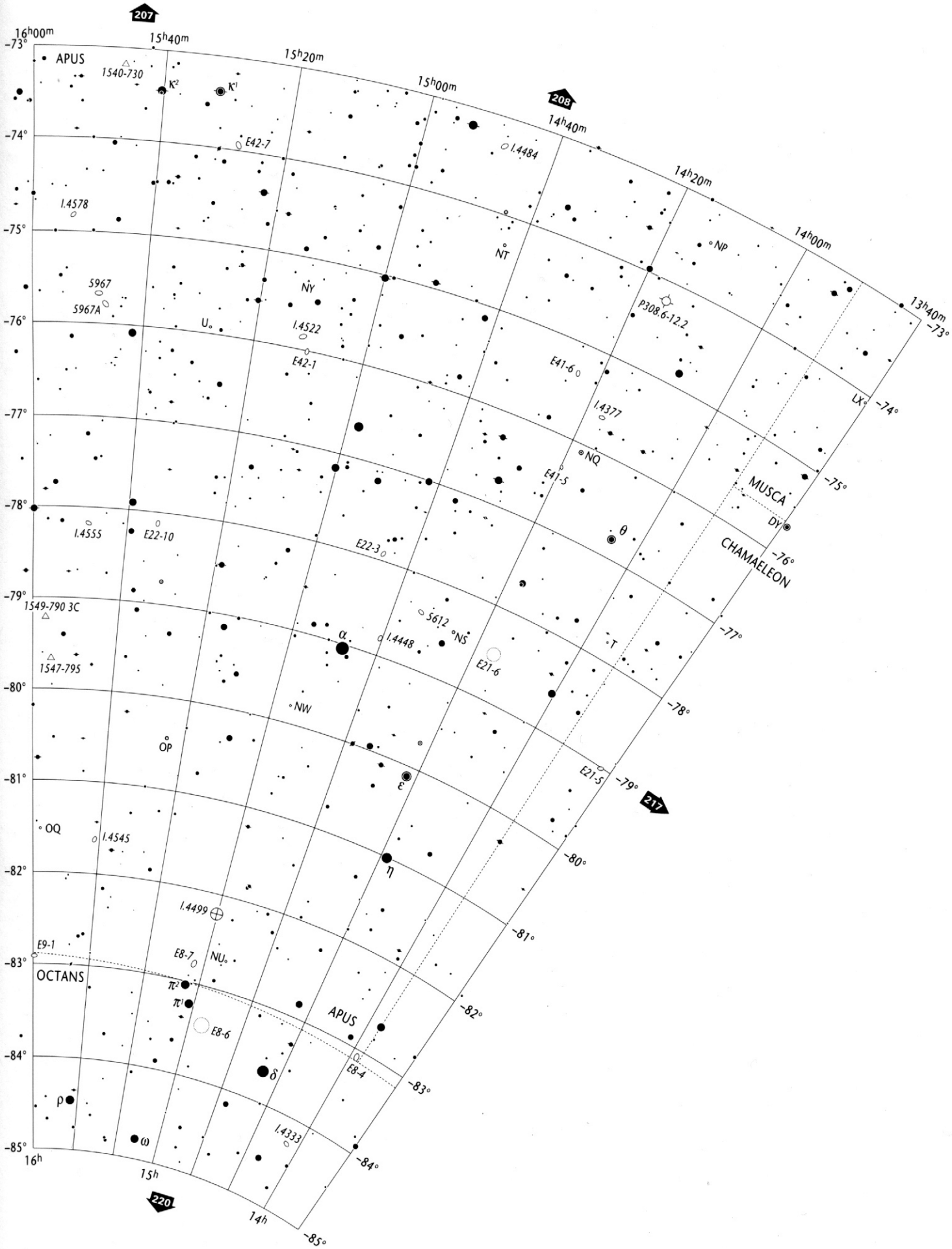
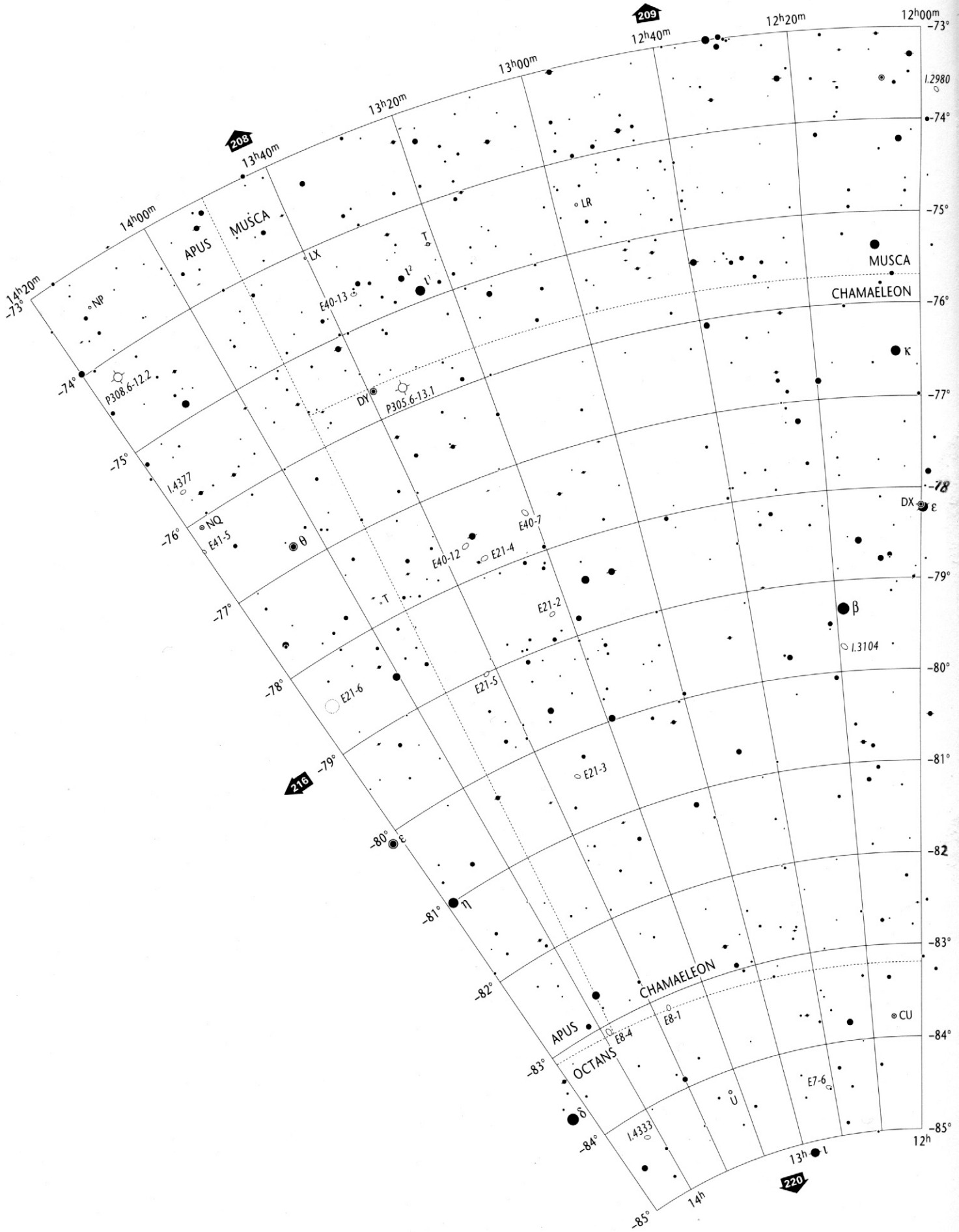


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

13h40m to 18h20m
-73° to -85°

APS
OCT, CHA, MUS, PAV

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60°

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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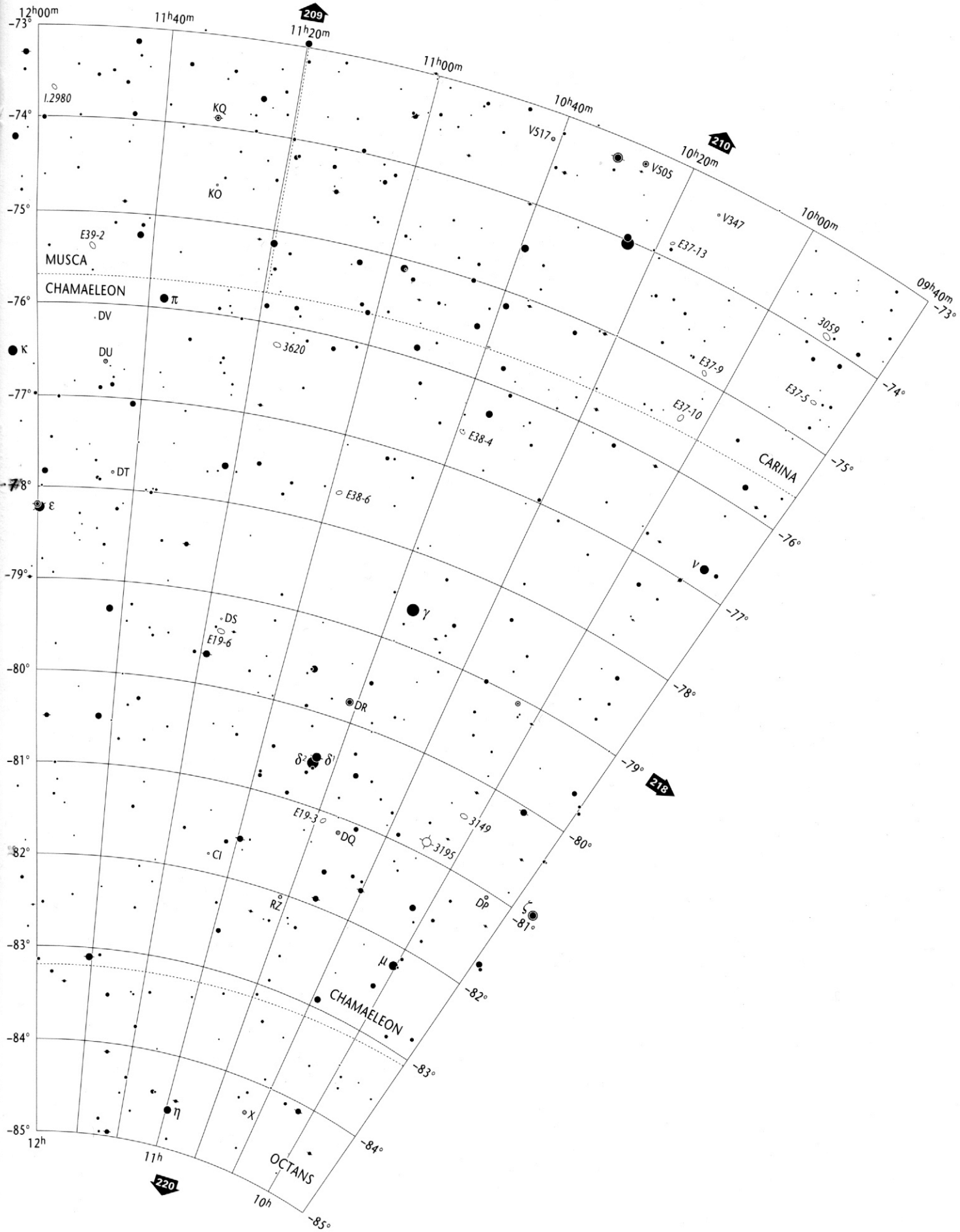
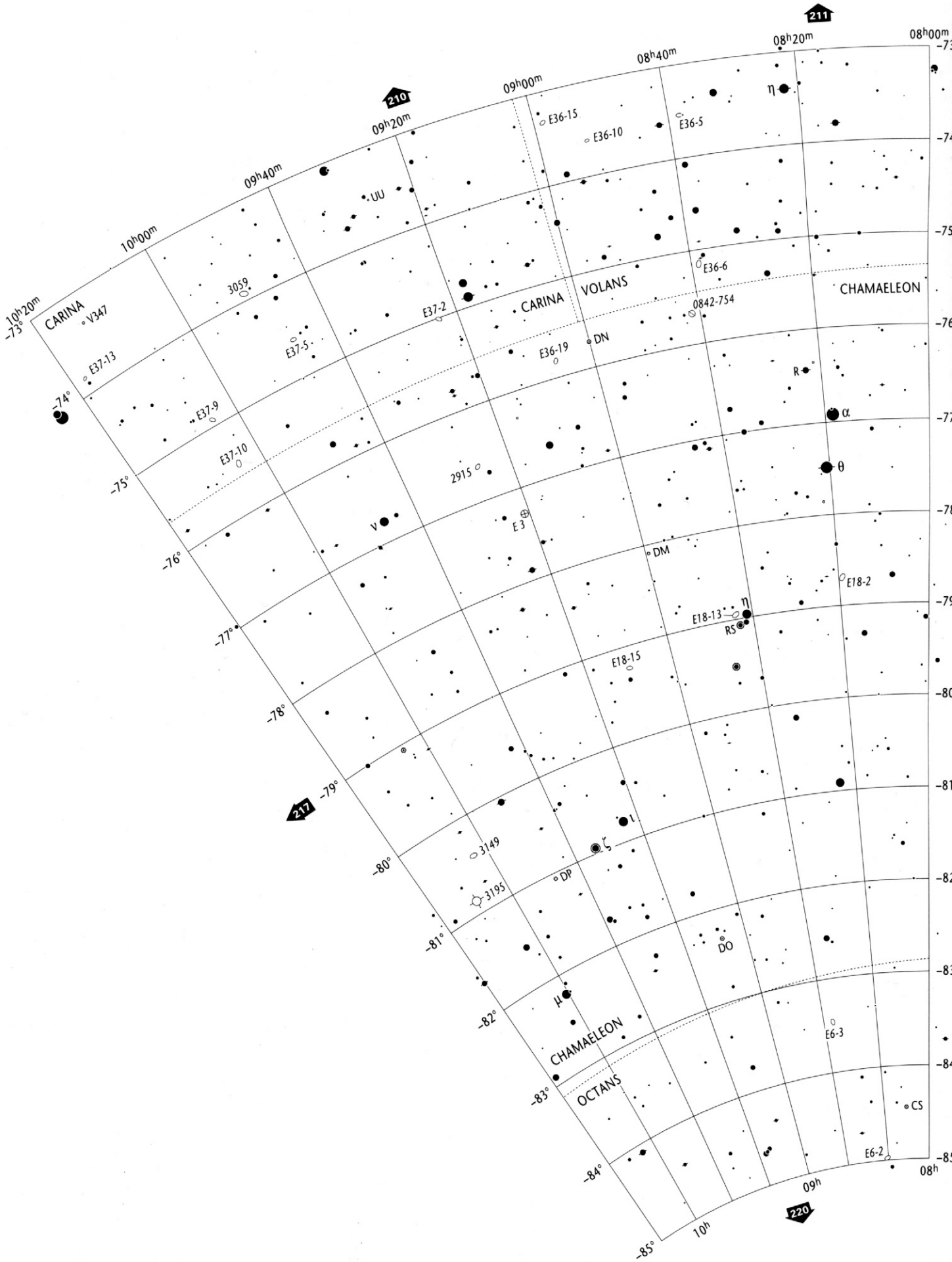


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale

09h40m to 14h20m
-73° to -85°

CHA
MUS, CAR, APS, OCT

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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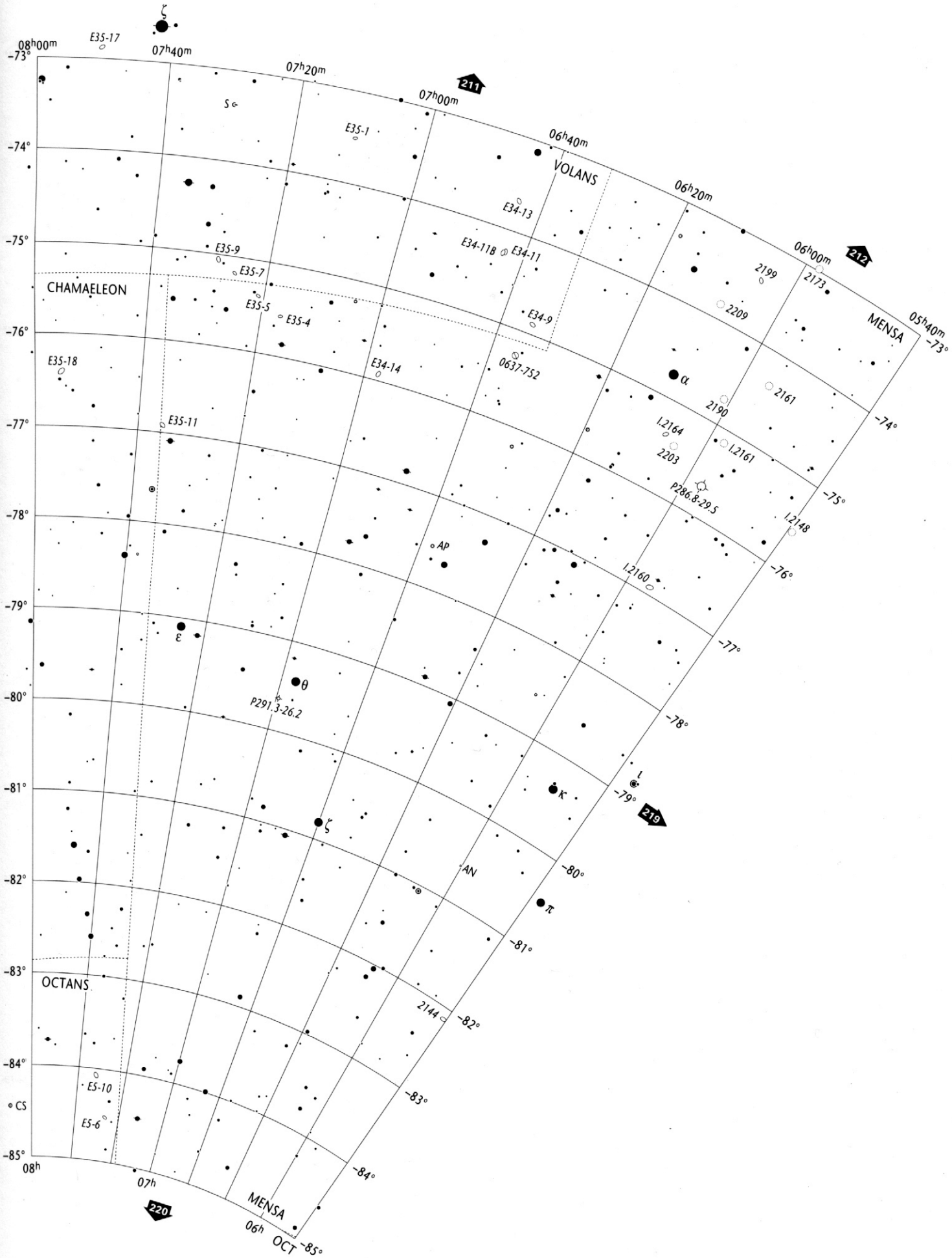
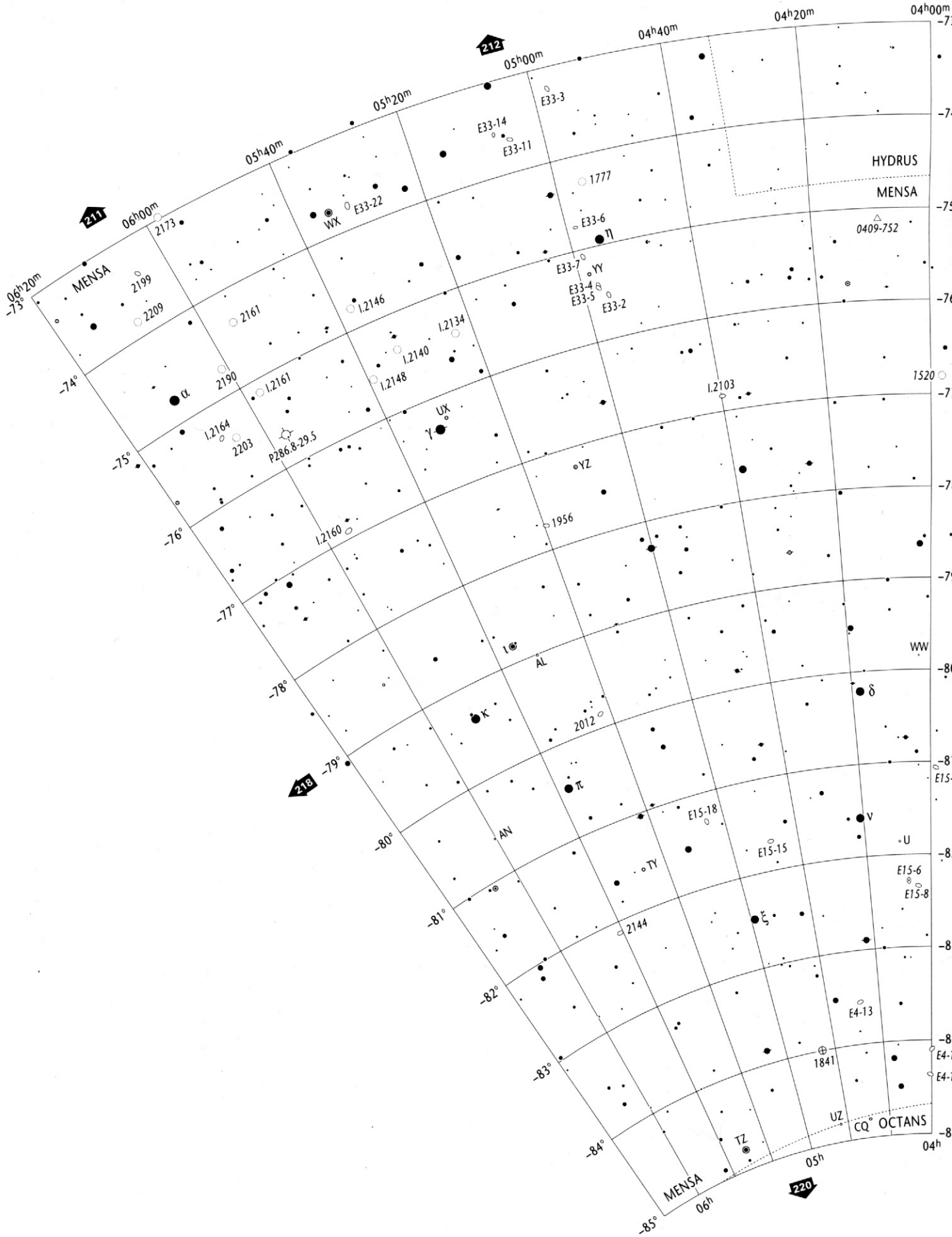


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster	05^h40^m to 10^h20^m $-73°$ to $-85°$	CHA
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale		MEN, VOL, CAR, OCT

Wil Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less | Amplitude 2.0 mag. | Amplitude 3.0 mag. | Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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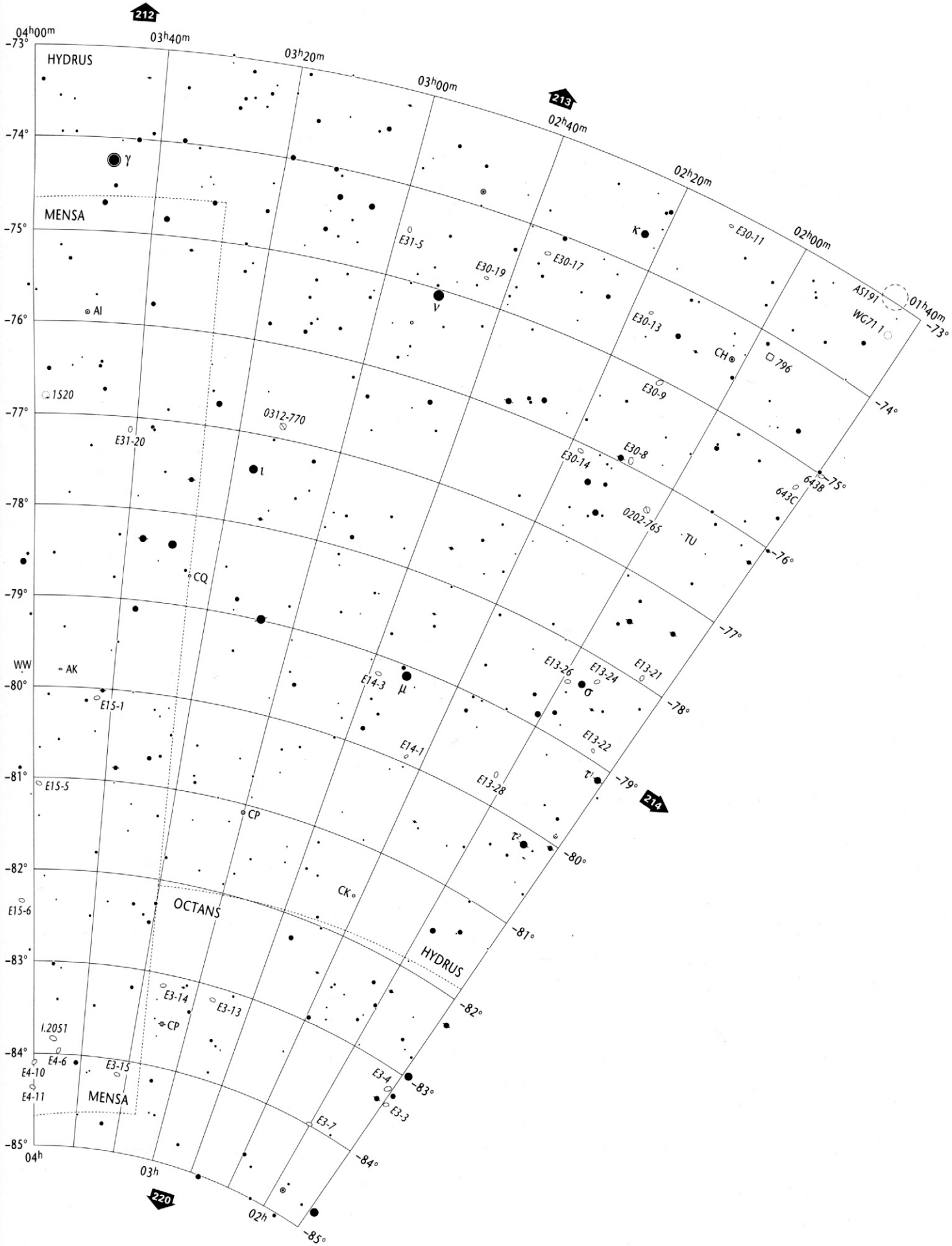
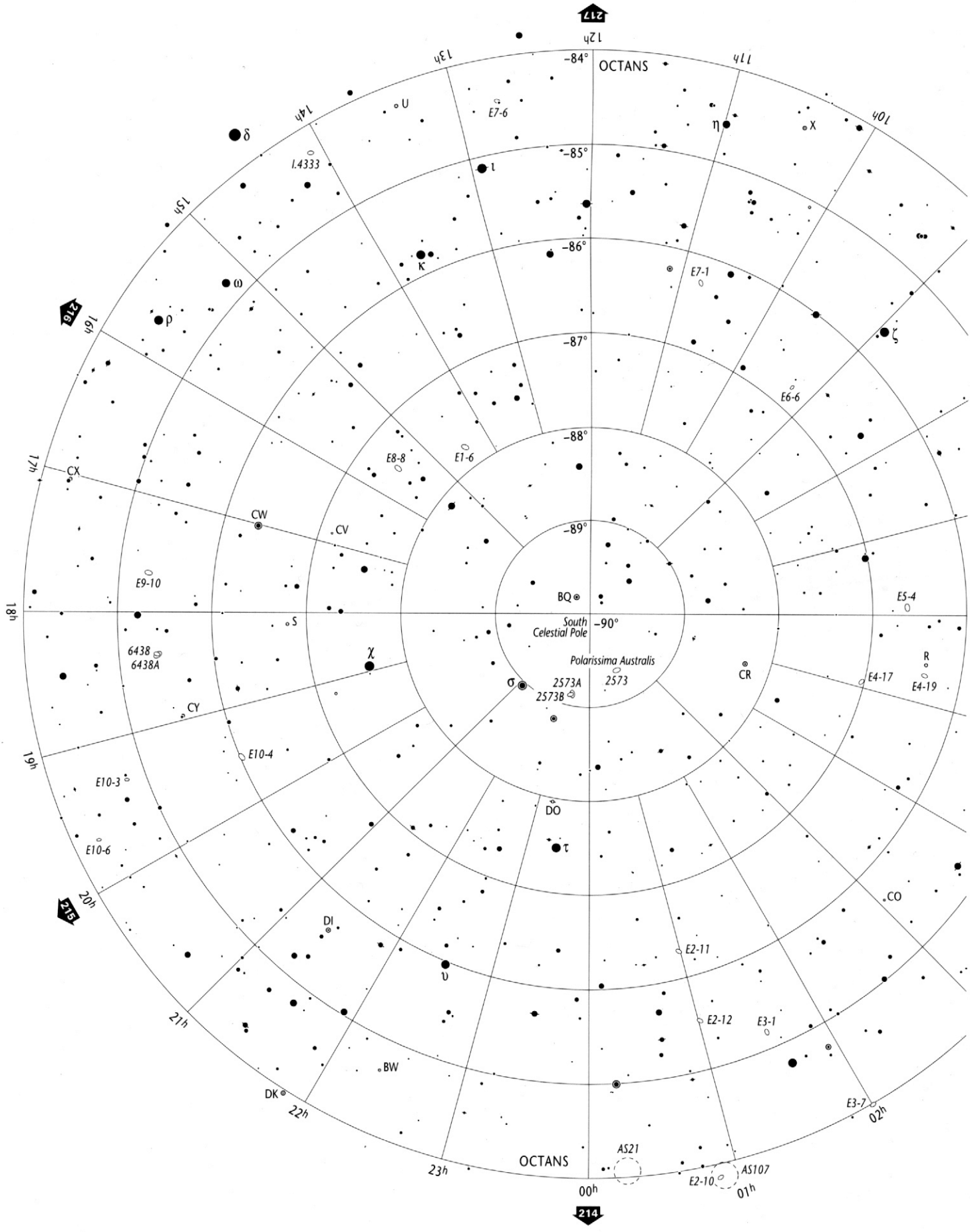


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster
to scale, < 5'	to scale, < 5'	>30", 30"-10", 10"-5", < 5"	to scale, 10' - 5', < 5'	> 5' to scale; 5'-2', 2'-1', < 1' major axis	to scale

01h40m to 06h20m
-73° to -85°

MEN
HYI, OCT

Will Tirion / Barry Rappaport / Will Remaklus



Stellar Magnitudes (V)

0.0 and brighter · 0.5 · 1.0 · 1.5 · 2.0 · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 9.7

Double or Multiple Stars

Individual members are plotted if separation exceeds 60"

Variable Stars

Amplitude 1.0 mag. or less · Amplitude 2.0 mag. · Amplitude 3.0 mag. · Amplitude 4.0 mag.

Nova
Quasar
Radio Source
X-Ray Source

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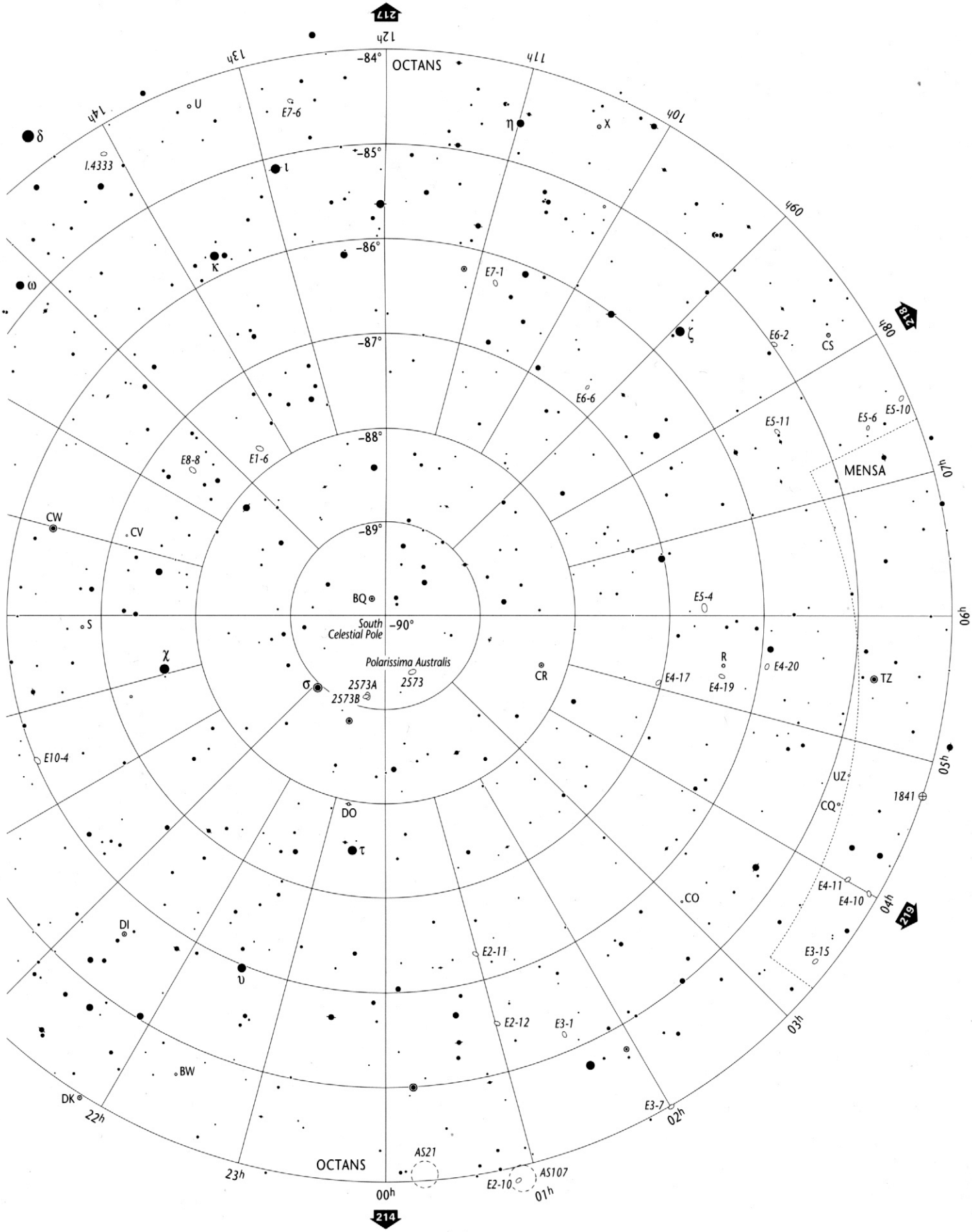
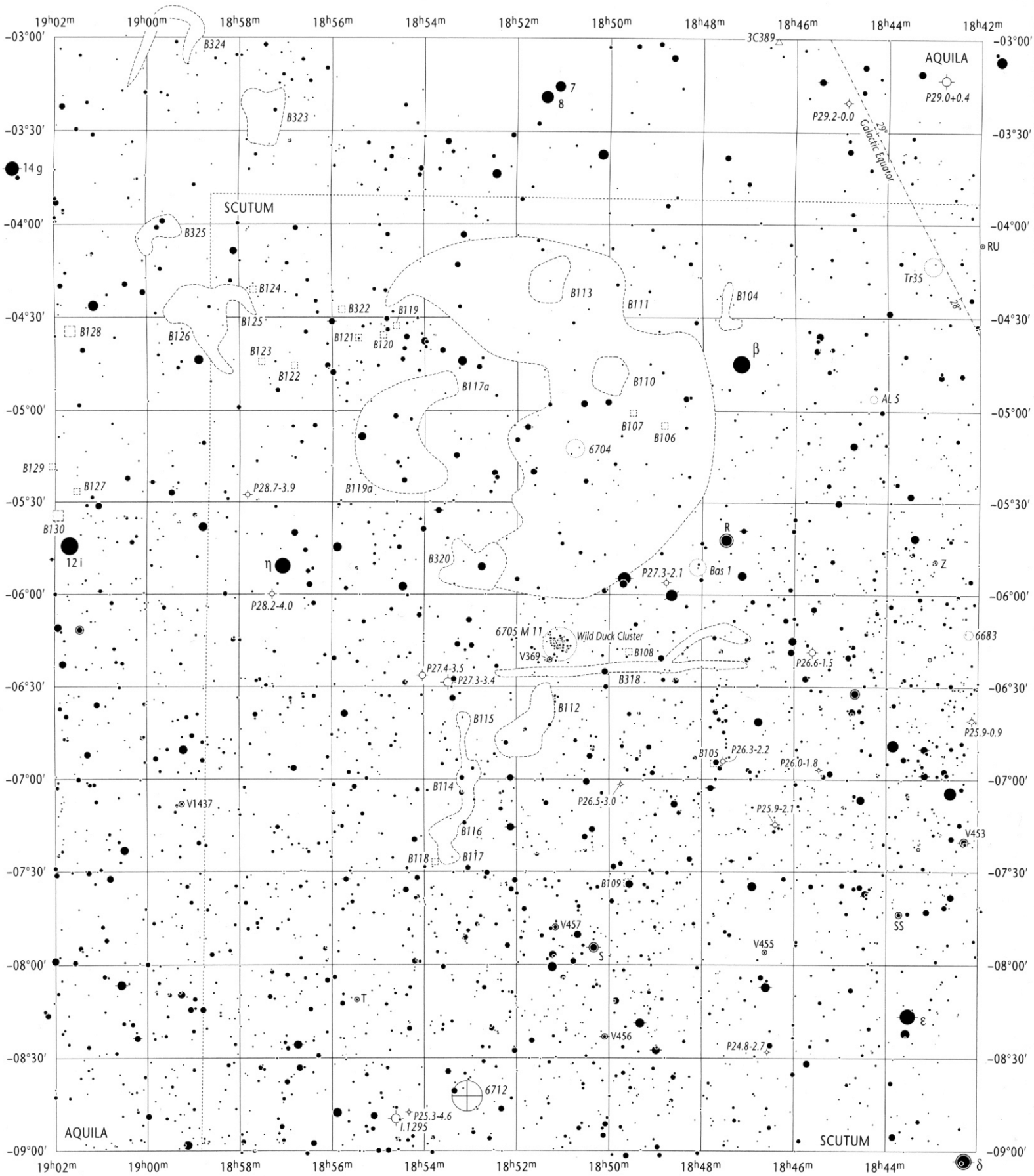


Open Star Clusters and Asterisms	Globular Star Clusters	Planetary Nebulae	Bright & Dark Nebulae	Galaxies	Galaxy Cluster		
to scale < 5'	to scale < 5'	>30" 30"-10" 10"-5" < 5"	to scale 10' - 5' < 5'	> 5' to scale; 5'-2' 2'-1' < 1' major axis	to scale	**00h00m to 24h00m -84° to -90°**	**OCT MEN**

Wil Tirion / Barry Rappaport / Will Remaklus

A14 — M 11 / Scutum Star Cloud (Chart 125 / 105)



Stellar Magnitudes (V)

2.0 and brighter · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0 · 10.5 · 11.0 · 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5'

Galaxies: > 2.5' to scale; 2.5'-1' · 1'-0.5' · < 0.5' major axis

Planetary Nebulae: > 60" · 60"-30" · 30"-10" · 10"-5" · < 5"

SCT
AQL

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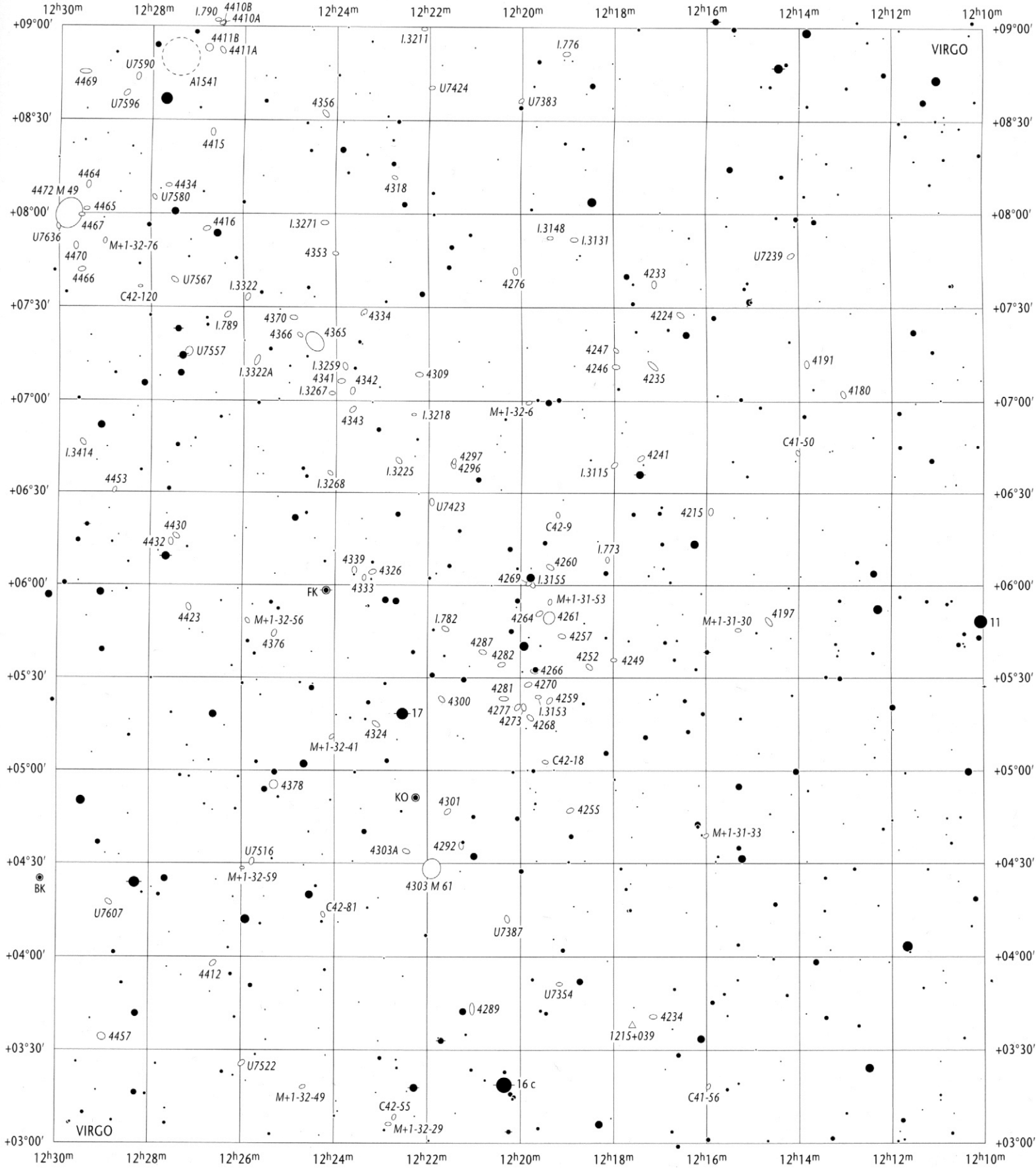
Virgo Galaxy Cluster (Charts 91 / 111) — A15



Stellar Magnitudes (V)

2.0 and brighter 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5′

Galaxies
>2.5′ to scale
2.5′-1′ 1′-0.5′ <0.5′ major axis

Planetary Nebulae
>60″ 30″-10″ 10″-5″ 60″-30″ <5″

VIR

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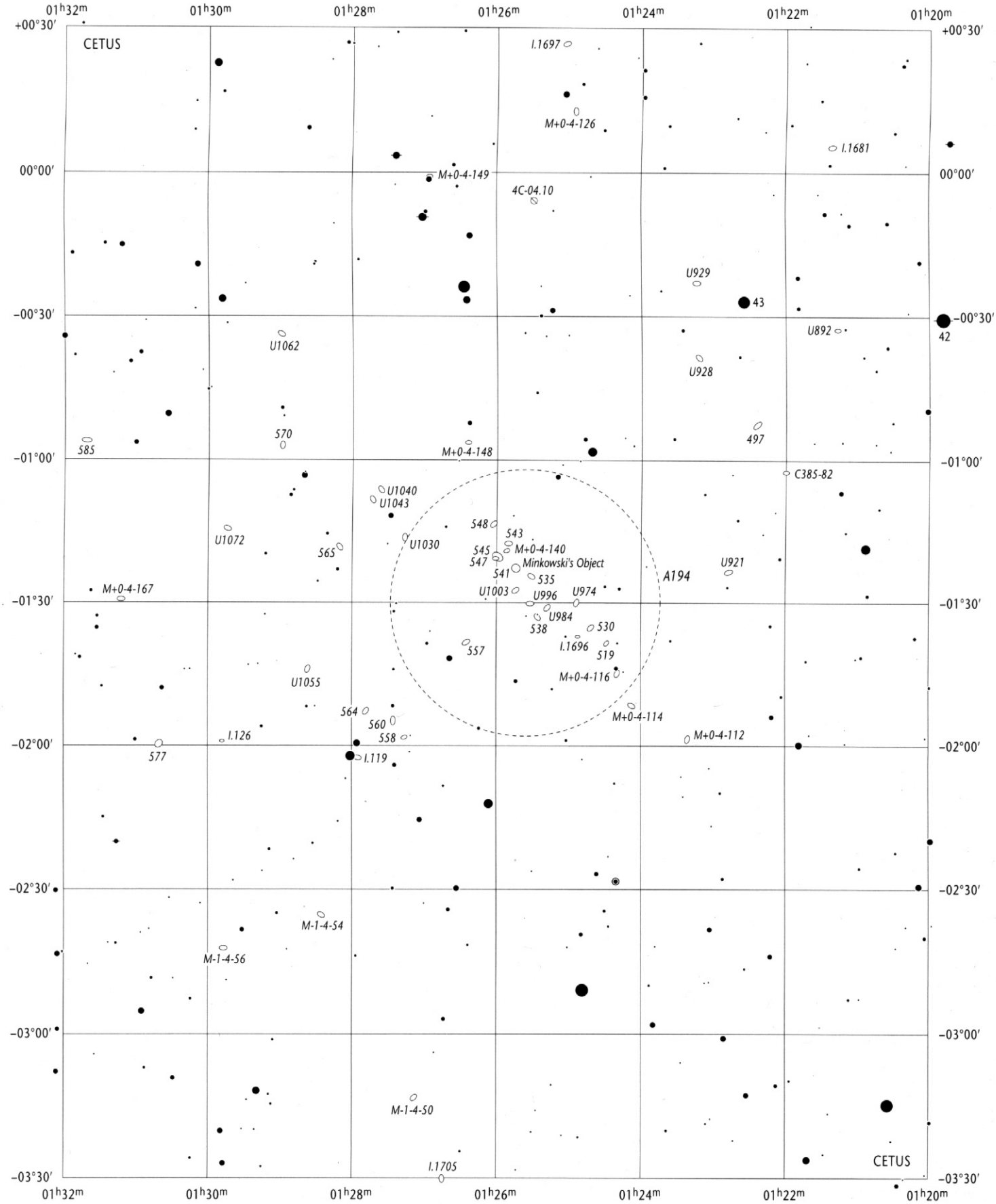
Wil Tirion / Barry Rappaport / Will Remaklus

A16 — Galaxy Cluster Abell 194 (Chart 120)



Stellar Magnitudes (V)

2.0 and brighter 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 1.7'

Galaxies
>1.7' to scale
1.7'-0.6' 0.6'-0.3' <0.3' major axis

Planetary Nebulae
>60° 30"-10"
60"-30" 10"-5"
<5"

CET

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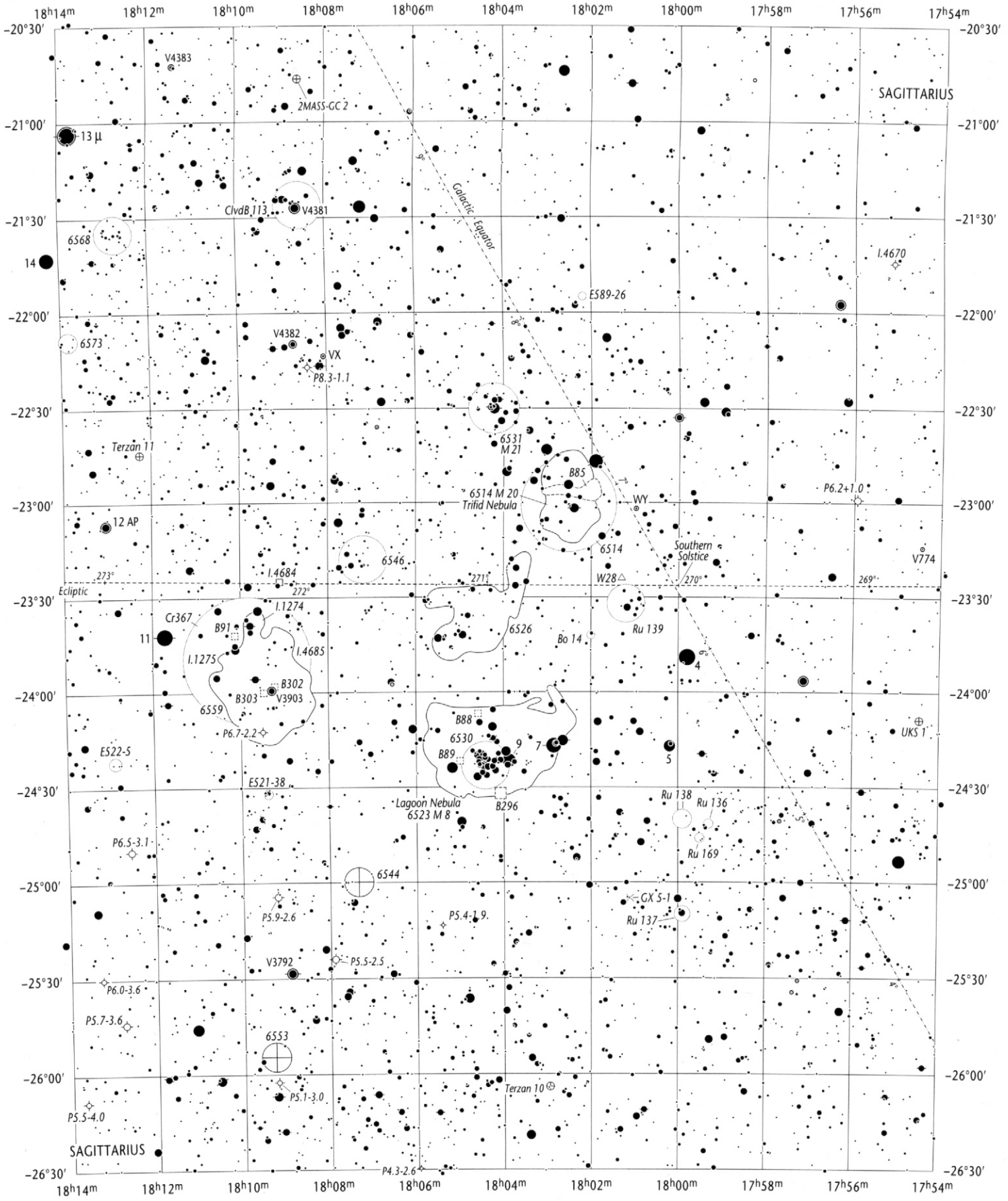
Trifid Nebula / Lagoon Nebula (Charts 145 / 146) — A17



Stellar Magnitudes (V)

2.0 and brighter · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0 · 10.5 · 11.0 · 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5′

Galaxies

> 2.5′ to scale · 2.5′-1′ · 1′-0.5′ · < 0.5′ major axis

Planetary Nebulae

> 60″ · 60″-30″ · 30″-10″ · 10″-5″ · < 5″

SGR

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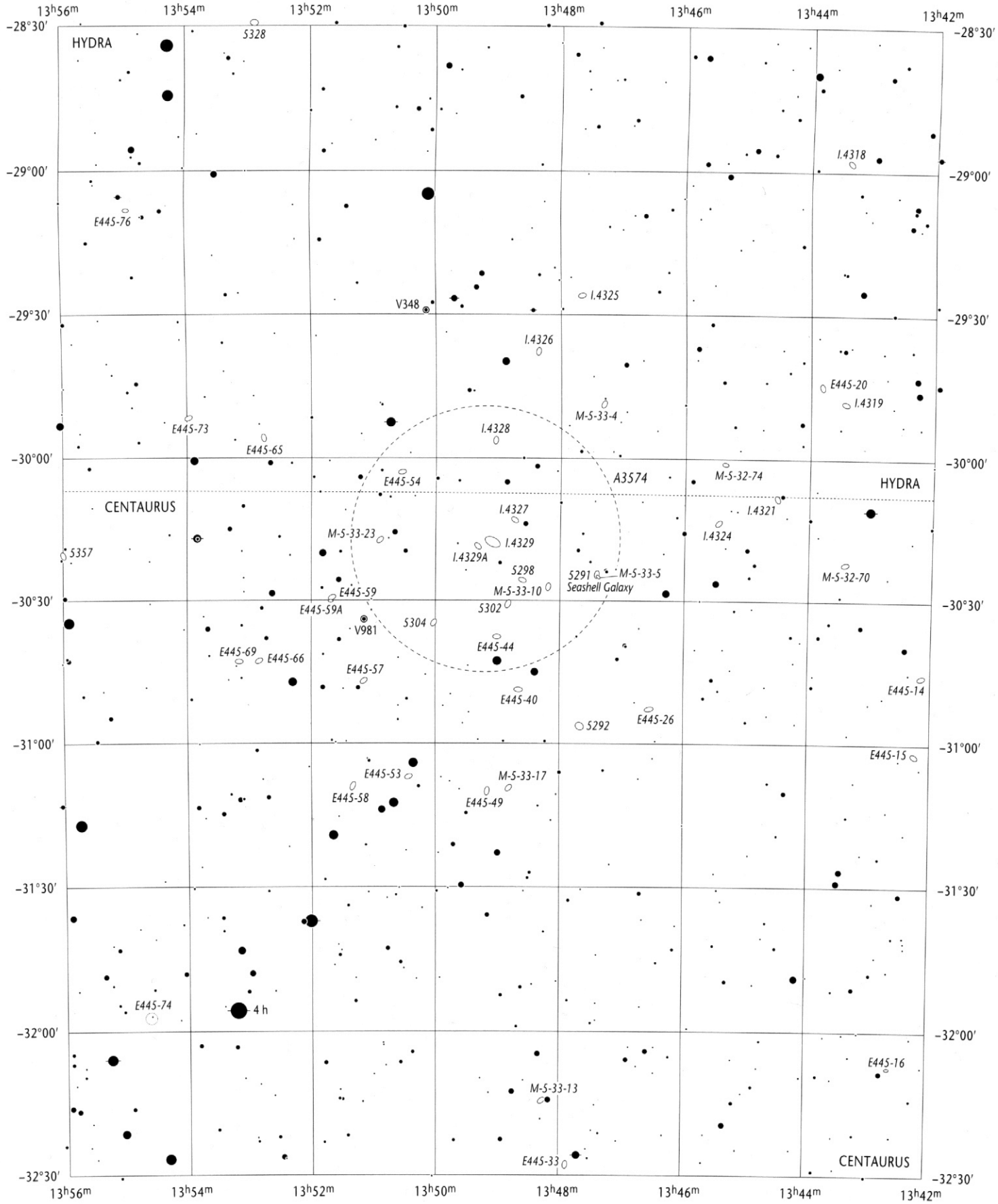
Wil Tirion / Barry Rappaport / Will Remaklus

A18 — Galaxy Cluster Abell 3574 (Charts 167 / 149)



Stellar Magnitudes (V)

2.0 and brighter 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 1.7'

Galaxies
>1.7' to scale
1.7'-0.6' 0.6'-0.3' <0.3' major axis

Planetary Nebulae
>60° 30"-10"
60"-30" 10"-5"
<5"

CEN
HYA

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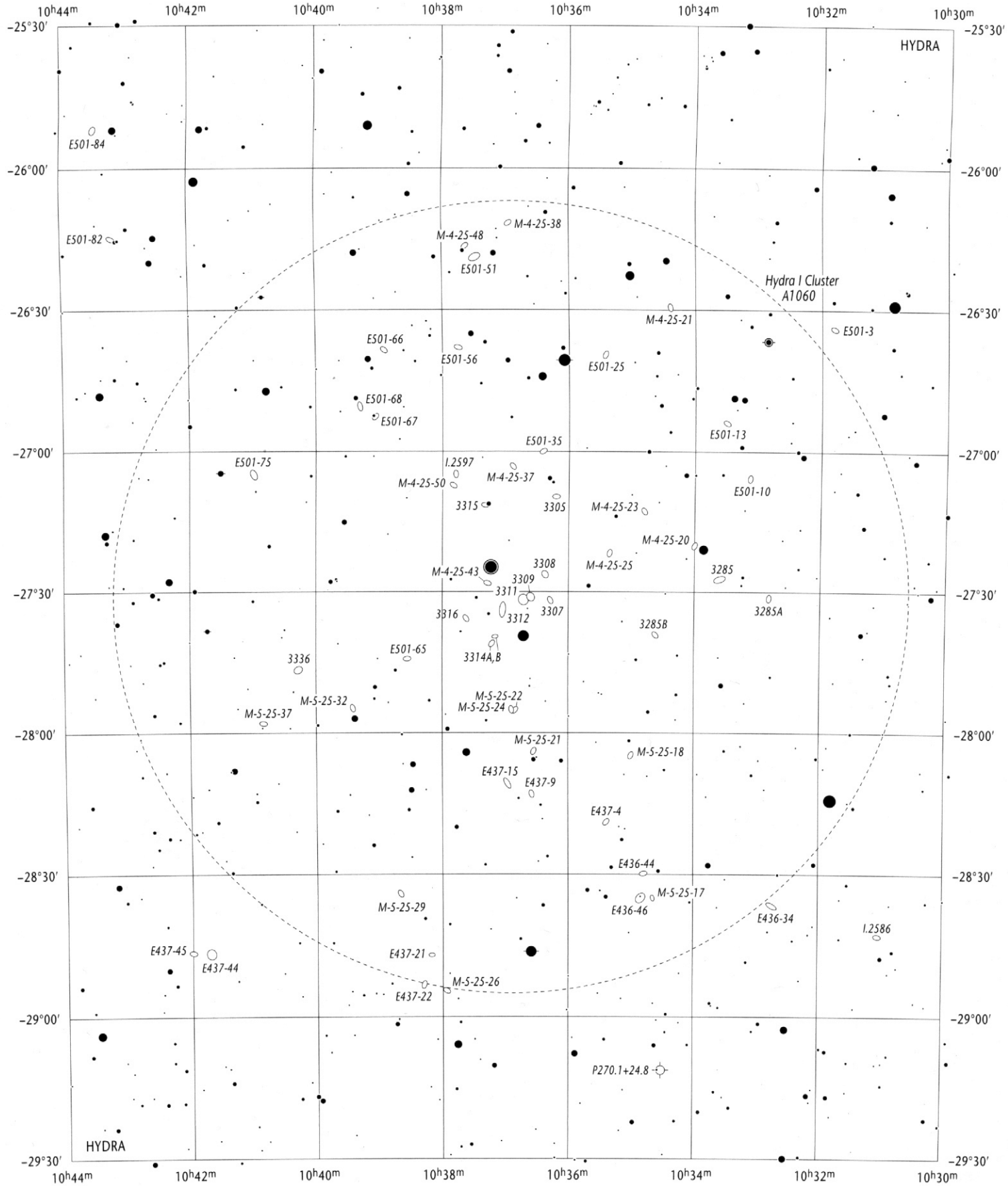
Wil Tirion / Barry Rappaport / Will Remaklus

Hydra I Cluster, Abell 1060 (Charts 151 / 169) — A19



Stellar Magnitudes (V)

2.0 and brighter 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 1.7'

Galaxies
>1.7' to scale
1.7'-0.6' 0.6'-0.3' <0.3' major axis

Planetary Nebulae
>60" 30"-10"
60"-30" 10"-5"
<5"

HYA

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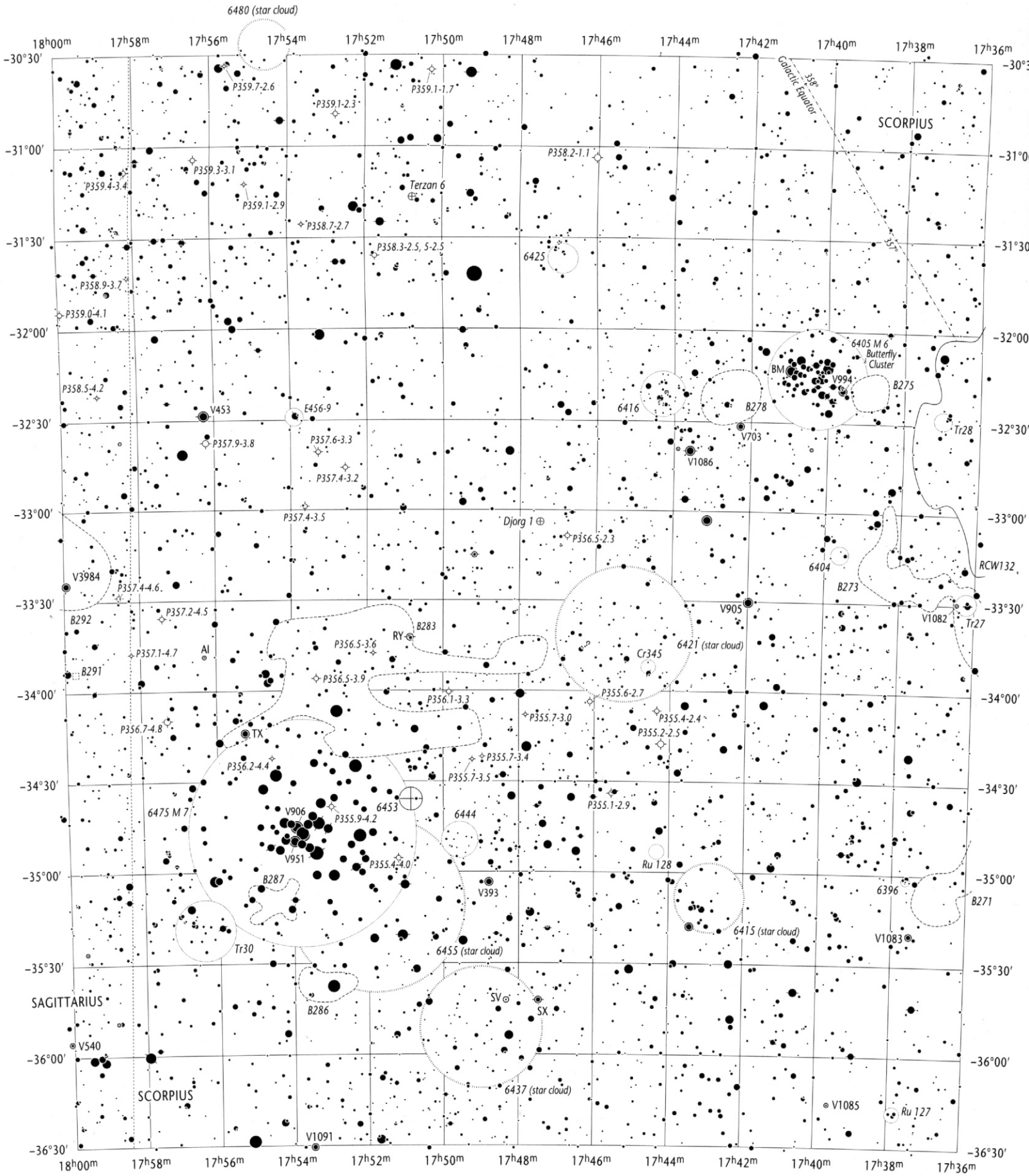
Wil Tirion / Barry Rappaport / Will Remaklus

A20 — M 6, Butterfly Cluster / M 7 (Charts 164 / 163)



Stellar Magnitudes (V)

2.0 and brighter 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5′

Galaxies
>2.5′ to scale
2.5′-1′ 1′-0.5′ <0.5′ major axis

Planetary Nebulae
>60° 30°-10°
60°-30° 10°-5°
<5°

SCO
SGR

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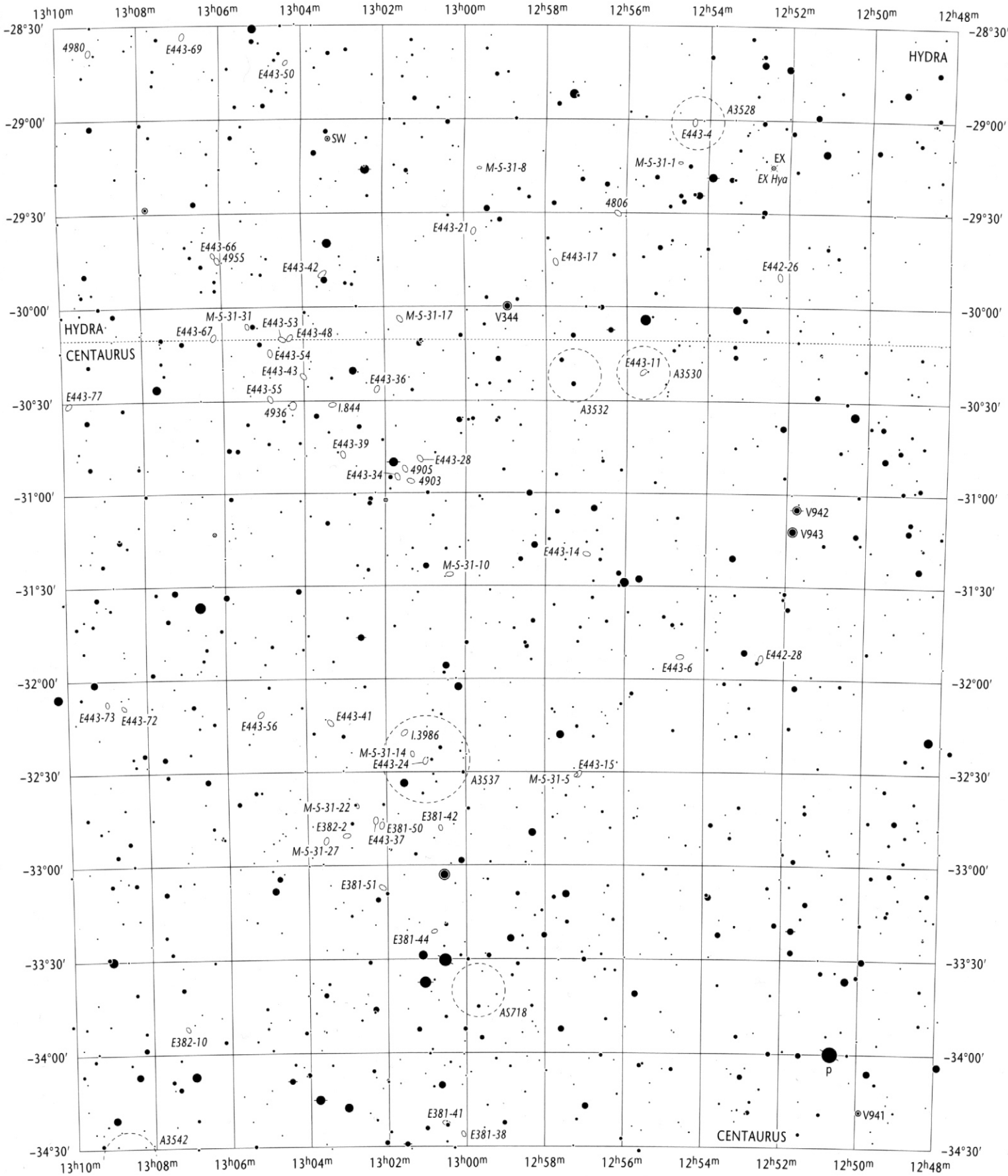
Galaxy Clusters in Hydra / Centaurus (Charts 167 / 149) — A21



Stellar Magnitudes (V)

2.0 and brighter 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5′

Galaxies
>2.5′ to scale
2.5′-1′ 1′-0.5′ <0.5′ major axis

Planetary Nebulae
>60″ 30″-10″
60″-30″ 10″-5″
<5″

CEN
HYA

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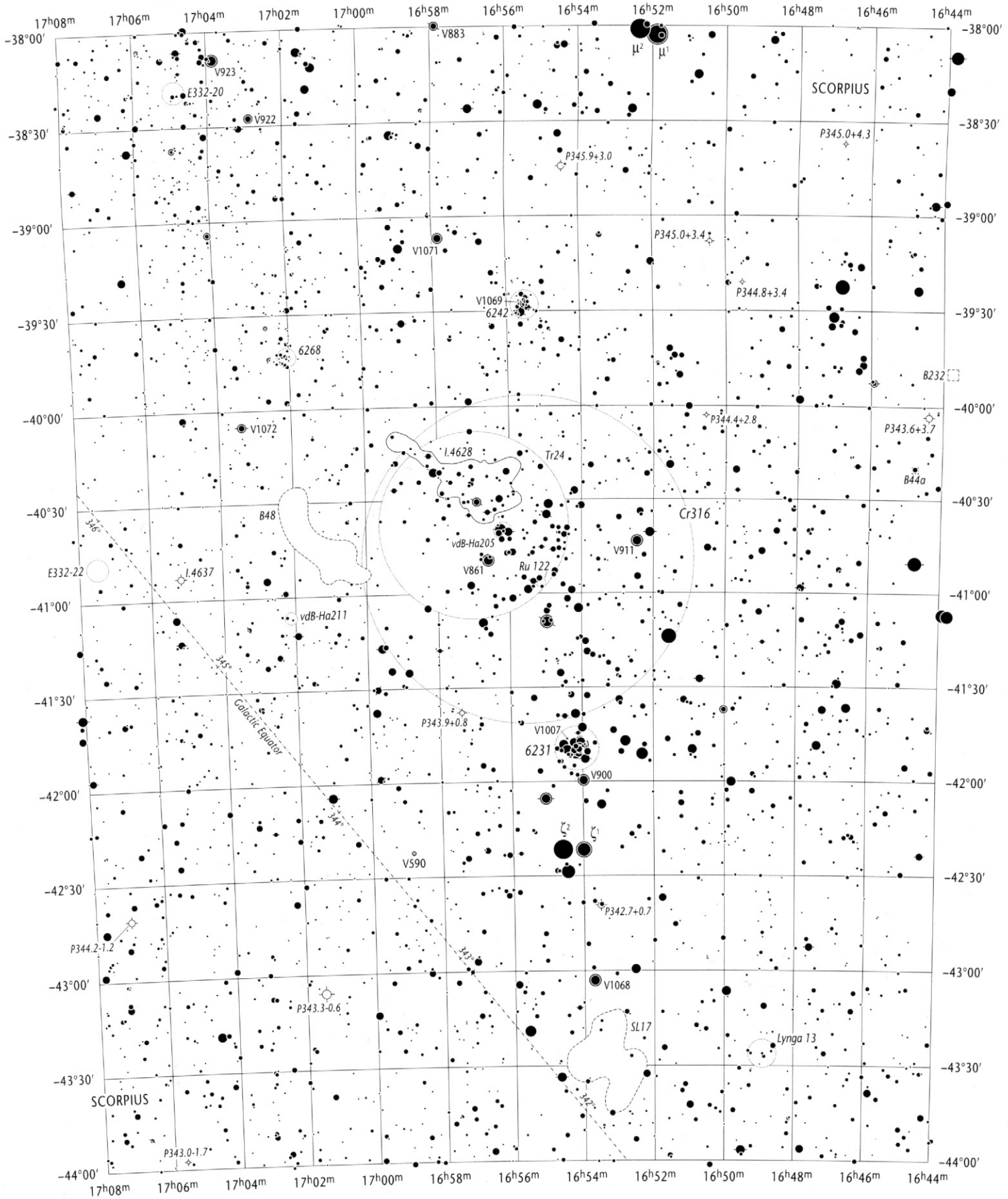
A22 — Zeta Scorpii Region (Charts 181 / 164 / 182)



Stellar Magnitudes (V)

2.0 and brighter · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0 · 10.5 · 11.0 · 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5'

Galaxies
>2.5' to scale
2.5'-1' · 1'-0.5' · <0.5' major axis

Planetary Nebulae
>60° · 30°-10° · 10°-5° · 60°-30° · <5°

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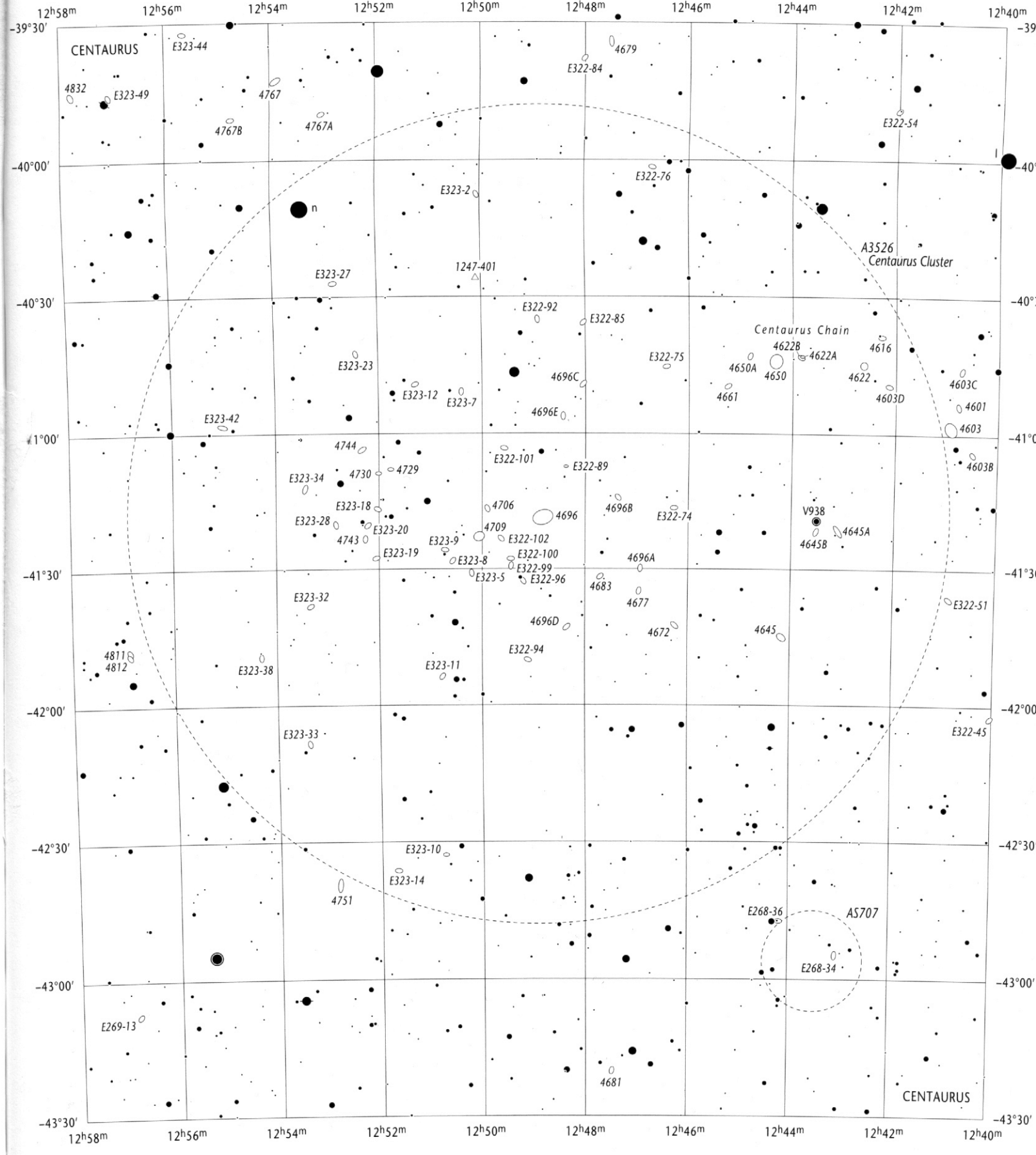
Centaurus Cluster, Abell 3526 (Charts 184 / 167 / 168) — A23



Stellar Magnitudes (V)

2.0 and brighter 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 1.7′

Galaxies
> 1.7′ to scale
1.7′-0.6′ 0.6′-0.3′ < 0.3′ major axis

Planetary Nebulae
> 60″
60″-30″
30″-10″
10″-5″
< 5″

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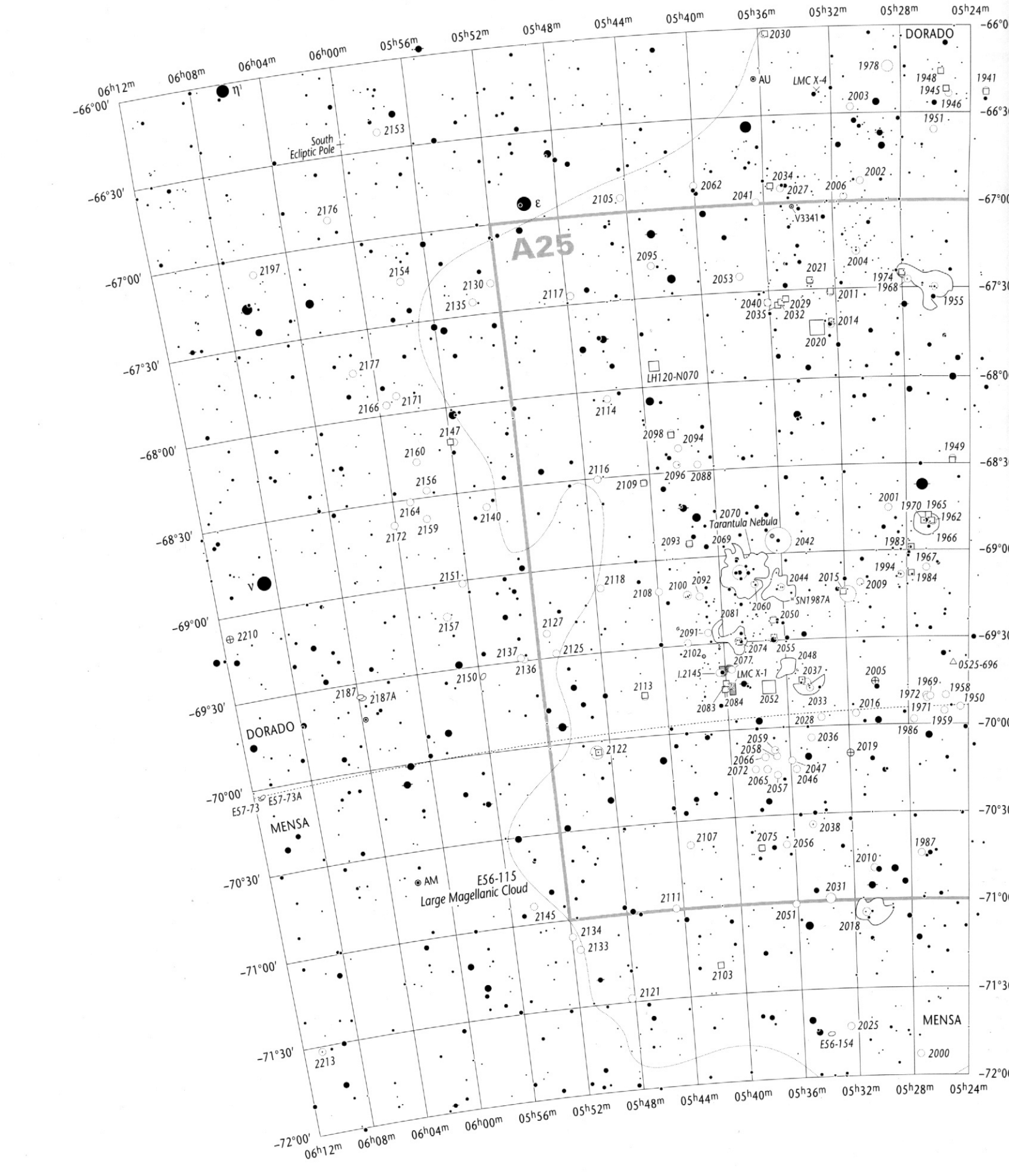
A24 — Large Magellanic Cloud (Charts 212 / 211)



Stellar Magnitudes (V)

2.0 and brighter 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5'

Galaxies
>2.5' to scale
2.5'-1' 1'-0.5' <0.5' major axis

Planetary Nebulae
>60° 30°-10° 10°-5° 60°-30° <5°

DOR
MEN

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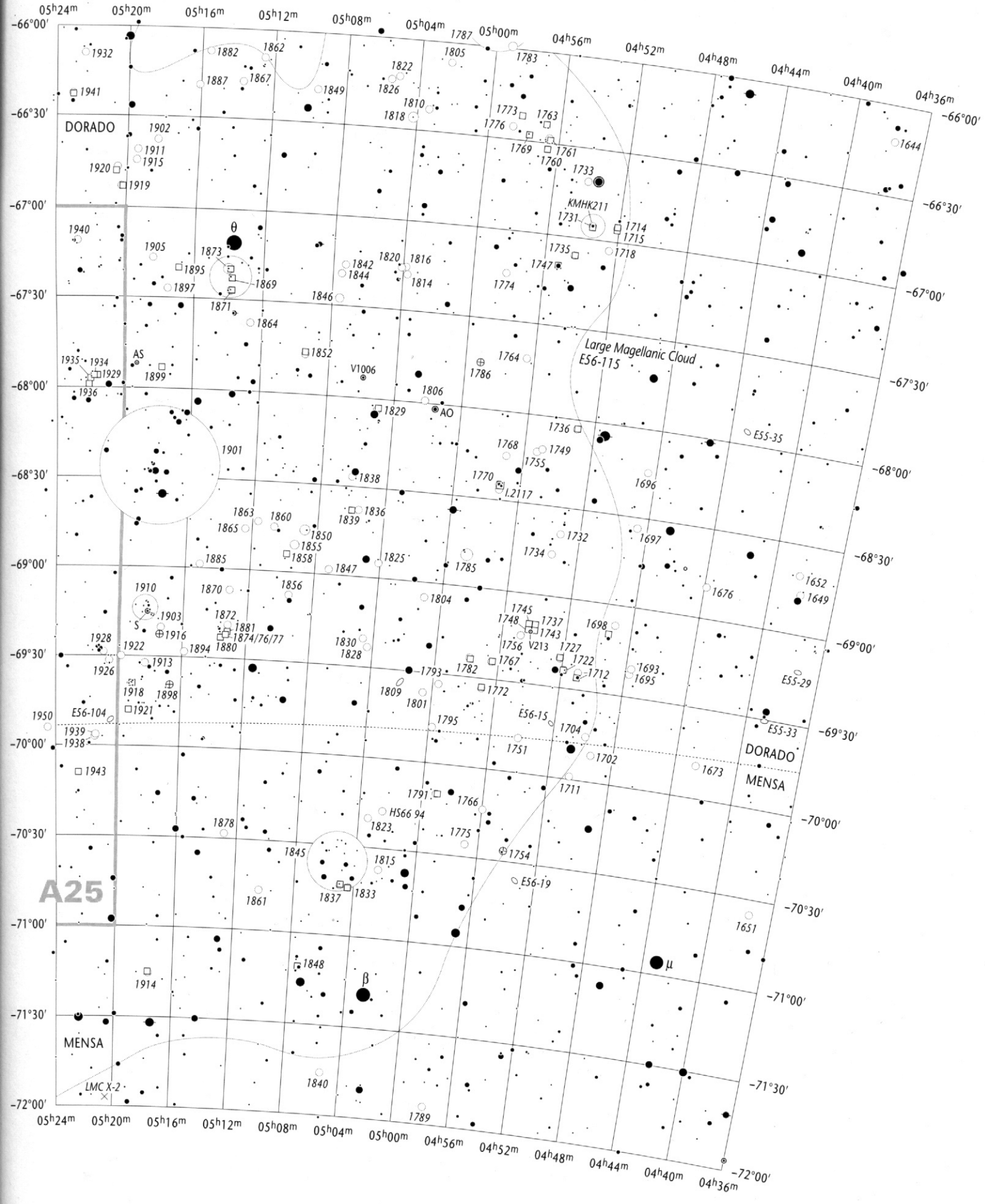
Large Magellanic Cloud (Charts 212 / 211) — A24



Stellar Magnitudes (V)

2.0 and brighter · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0 · 10.5 · 11.0 · 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5'

Galaxies
>2.5' to scale
2.5'-1' · 1'-0.5' · <0.5' major axis

Planetary Nebulae
>60° · 60°-30° · 30'-10' · 10'-5' · <5'

DOR
MEN

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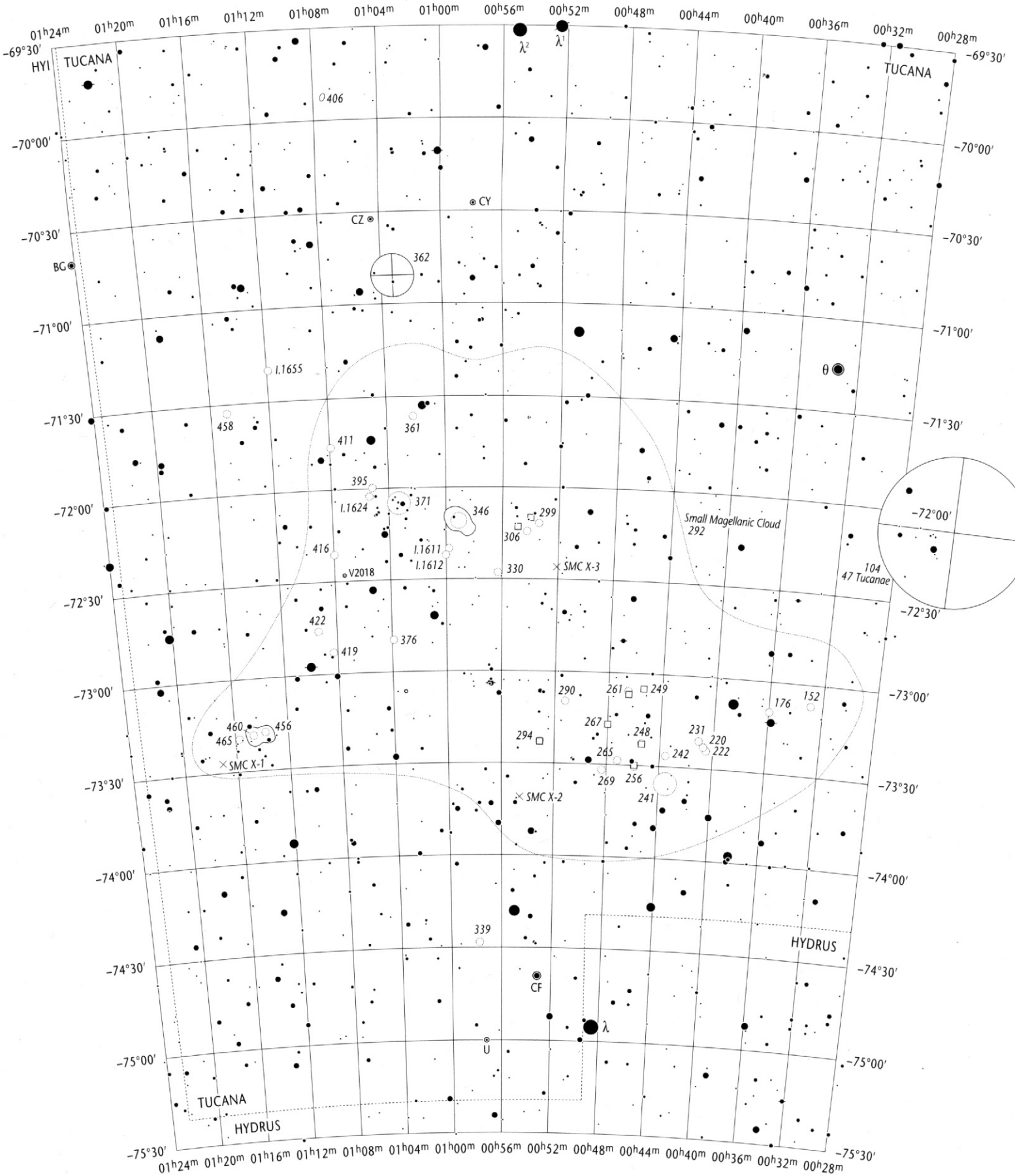
Small Magellanic Cloud (Charts 204 / 213 / 214) — A26



Stellar Magnitudes (V)

2.0 and brighter · 2.5 · 3.0 · 3.5 · 4.0 · 4.5 · 5.0 · 5.5 · 6.0 · 6.5 · 7.0 · 7.5 · 8.0 · 8.5 · 9.0 · 9.5 · 10.0 · 10.5 · 11.0 · 11.5 fainter

Open Star Clusters & Asterisms
Globular Star Clusters
Bright & Dark Nebulae
Objects are plotted to scale if larger than 2.5′

Galaxies

> 2.5′ to scale · 2.5′-1′ · 1′-0.5′ · < 0.5′ major axis

Planetary Nebulae

> 60′ · 30″-10″ · 60″-30″ · 10″-5″ · < 5″

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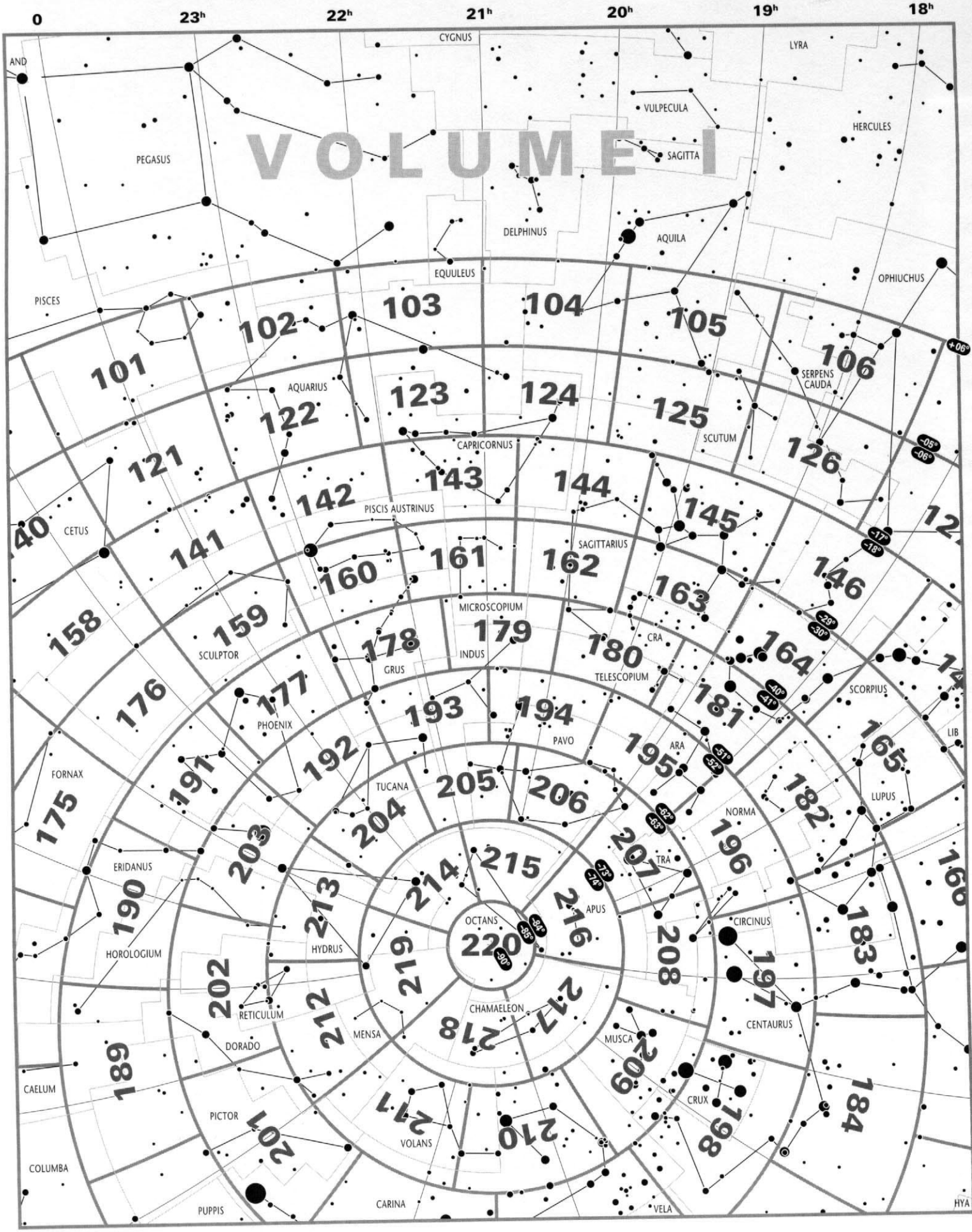

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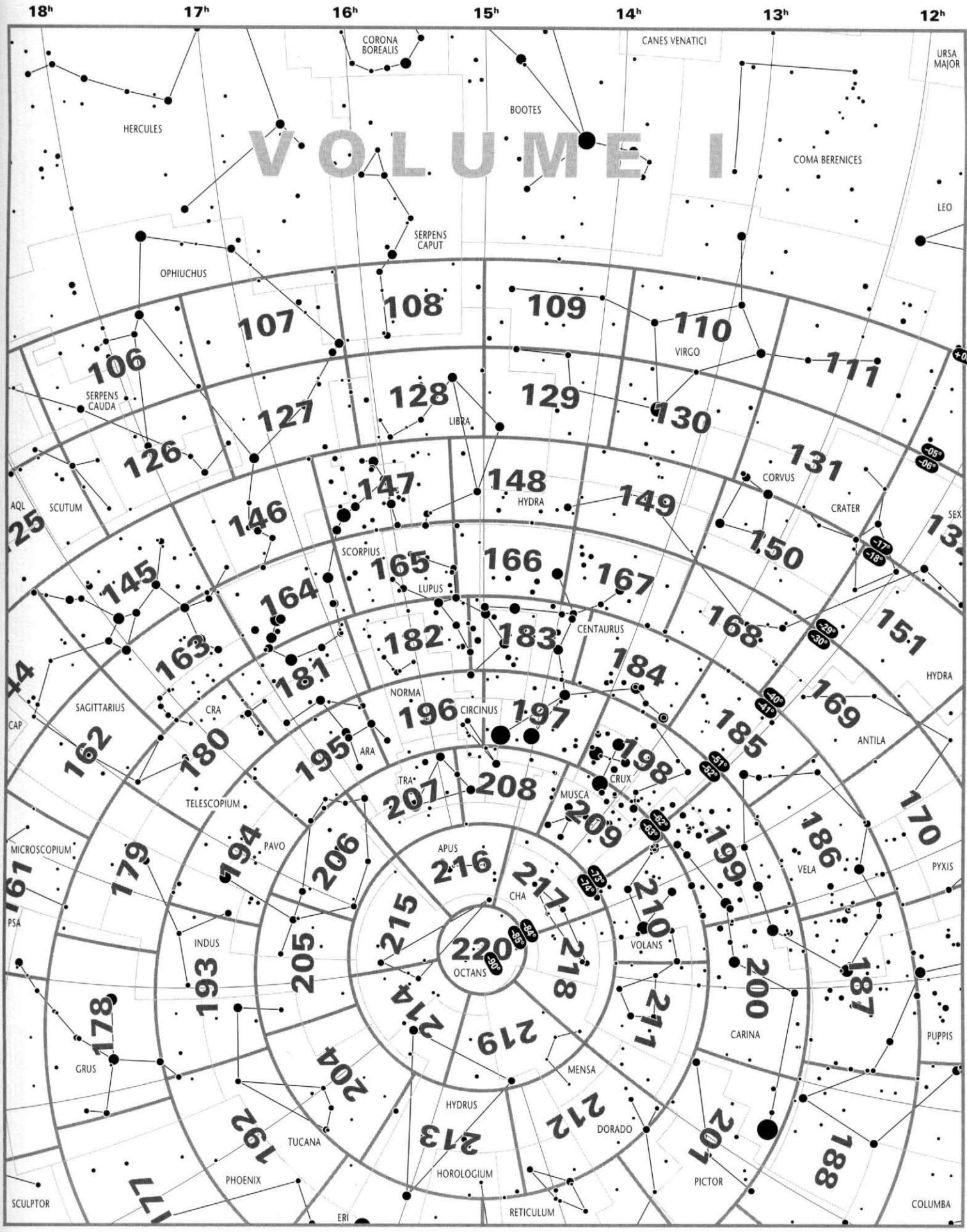

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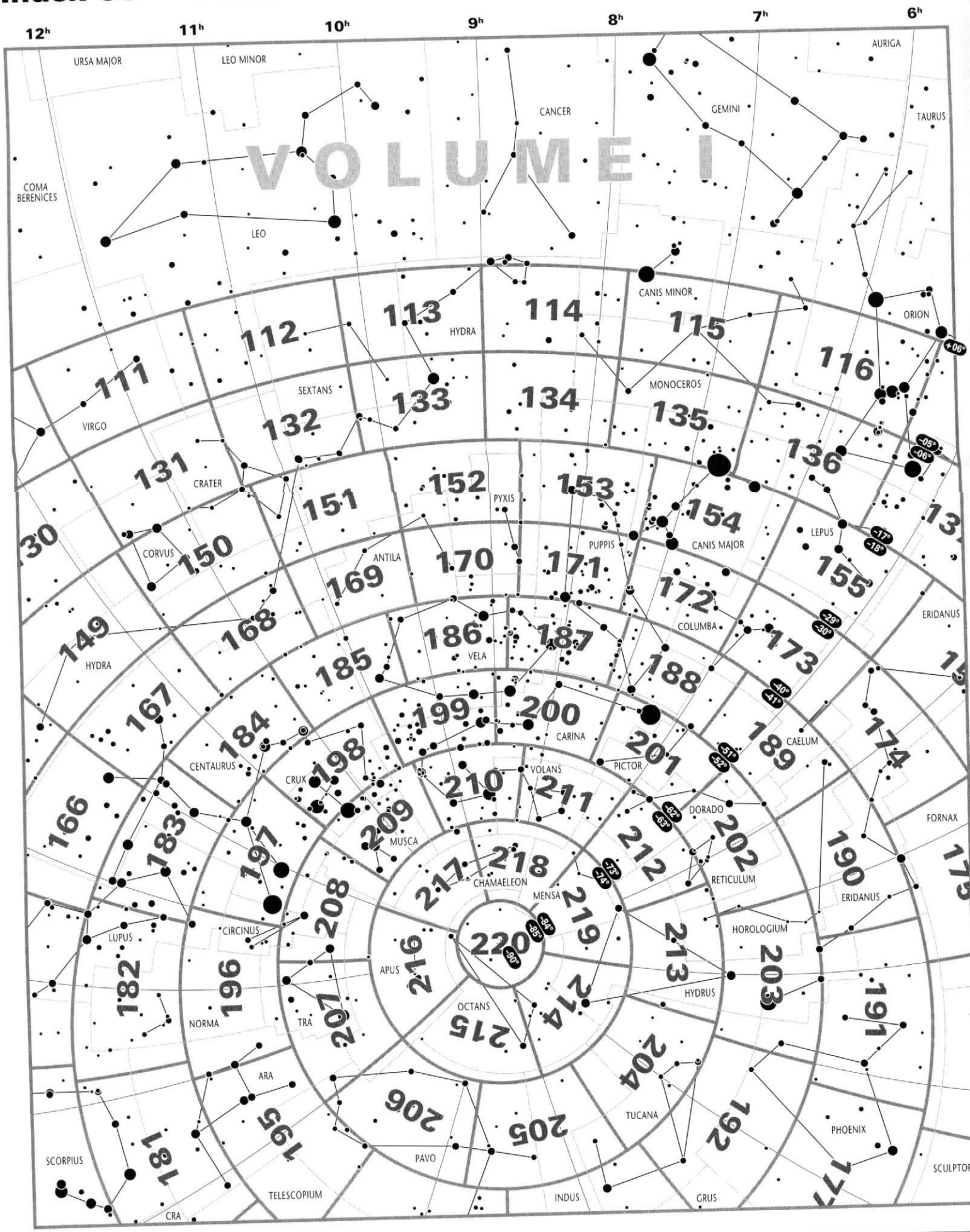
Index S3 — Volume II — 12h to 6h



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Stellar Magnitudes (V)

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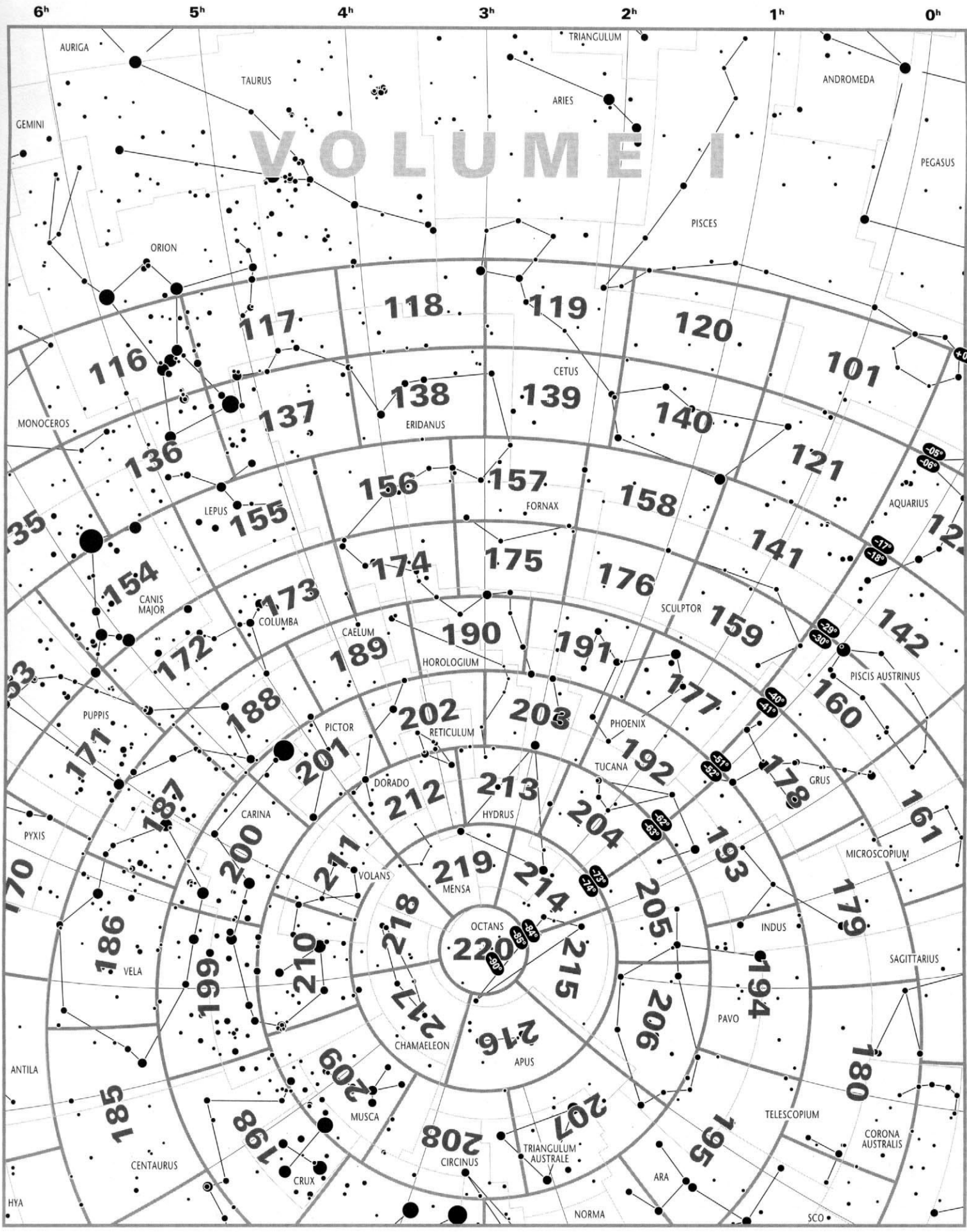

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Stellar Magnitudes (V)

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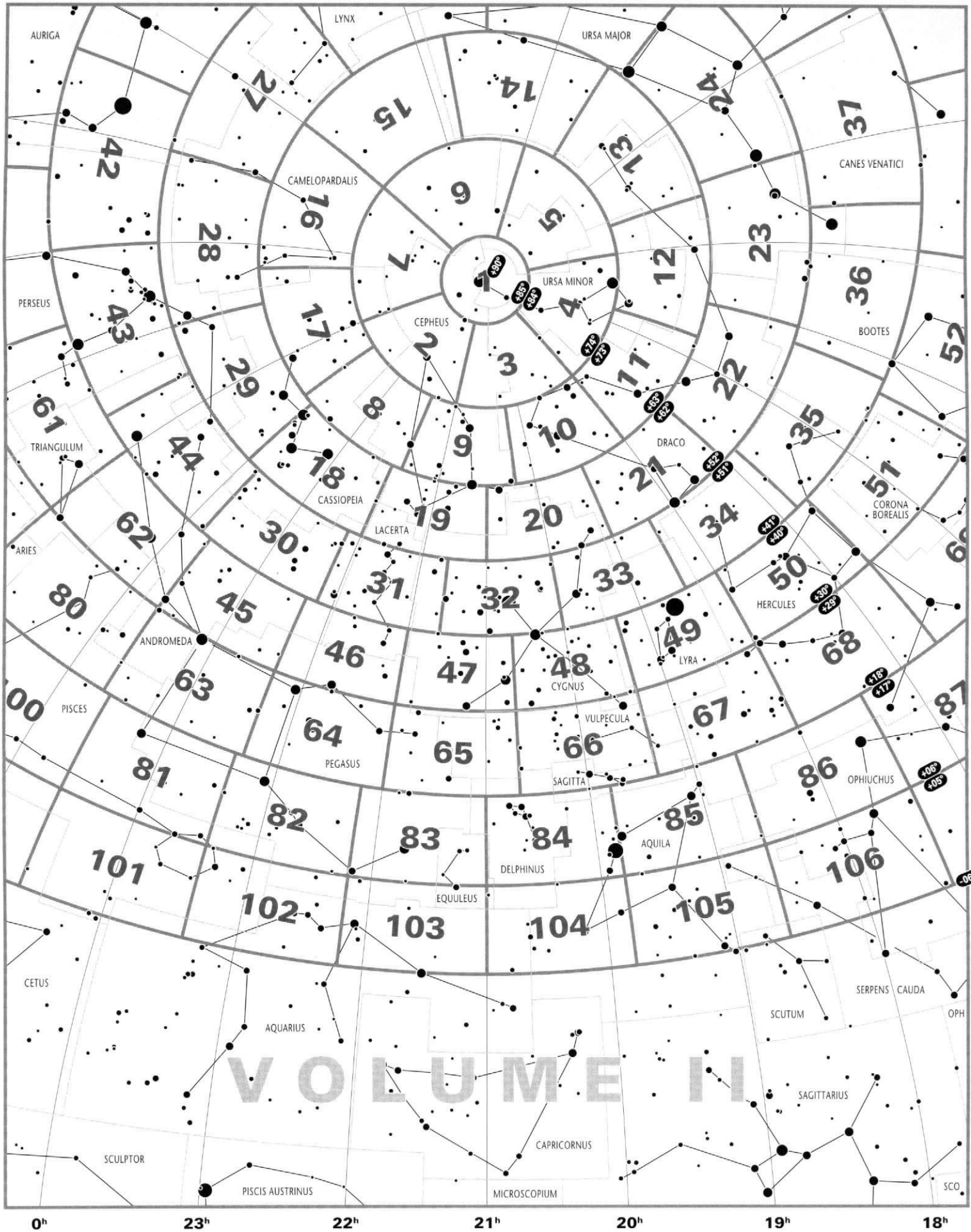

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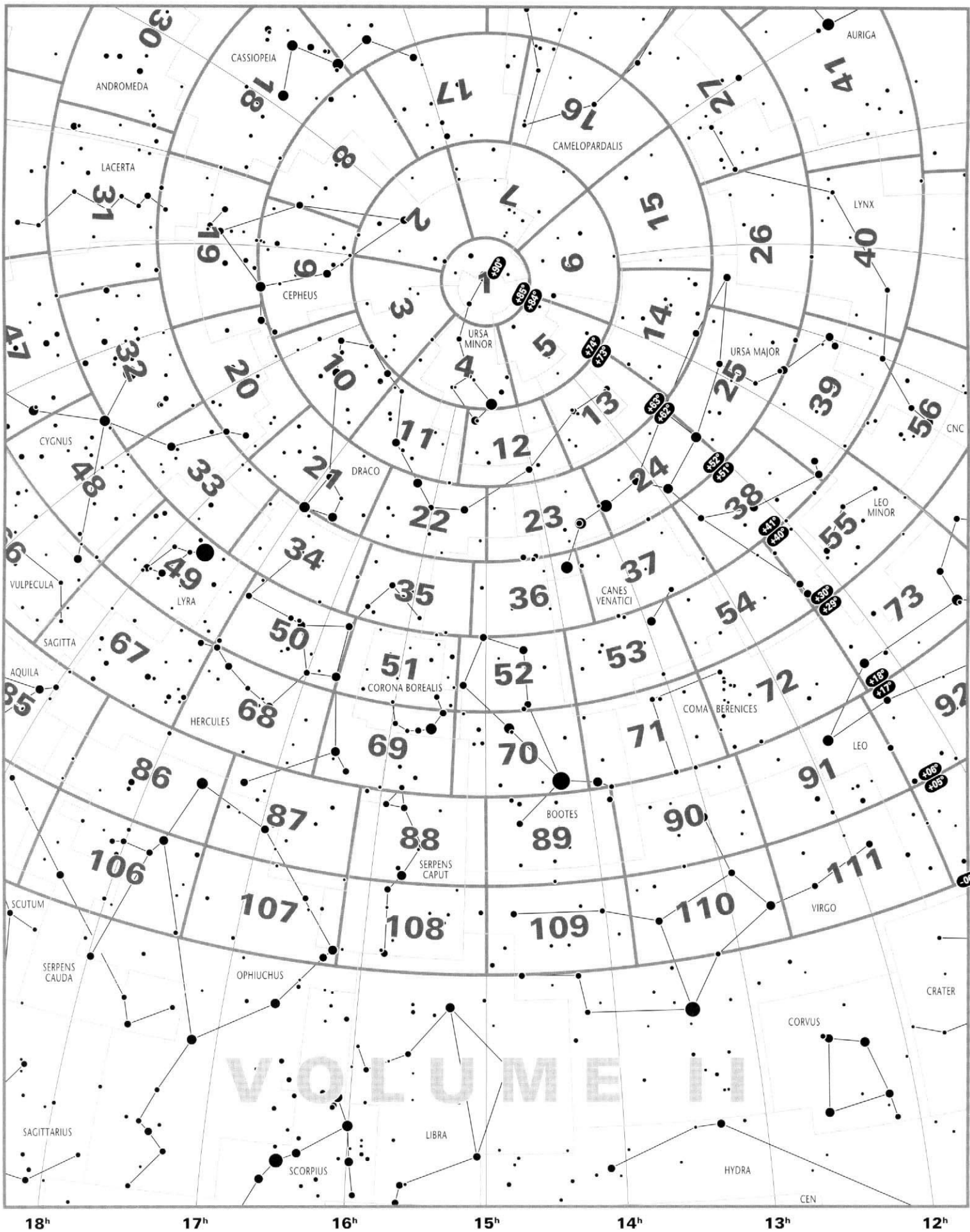
Index N2 — Volume I — 18h to 12h



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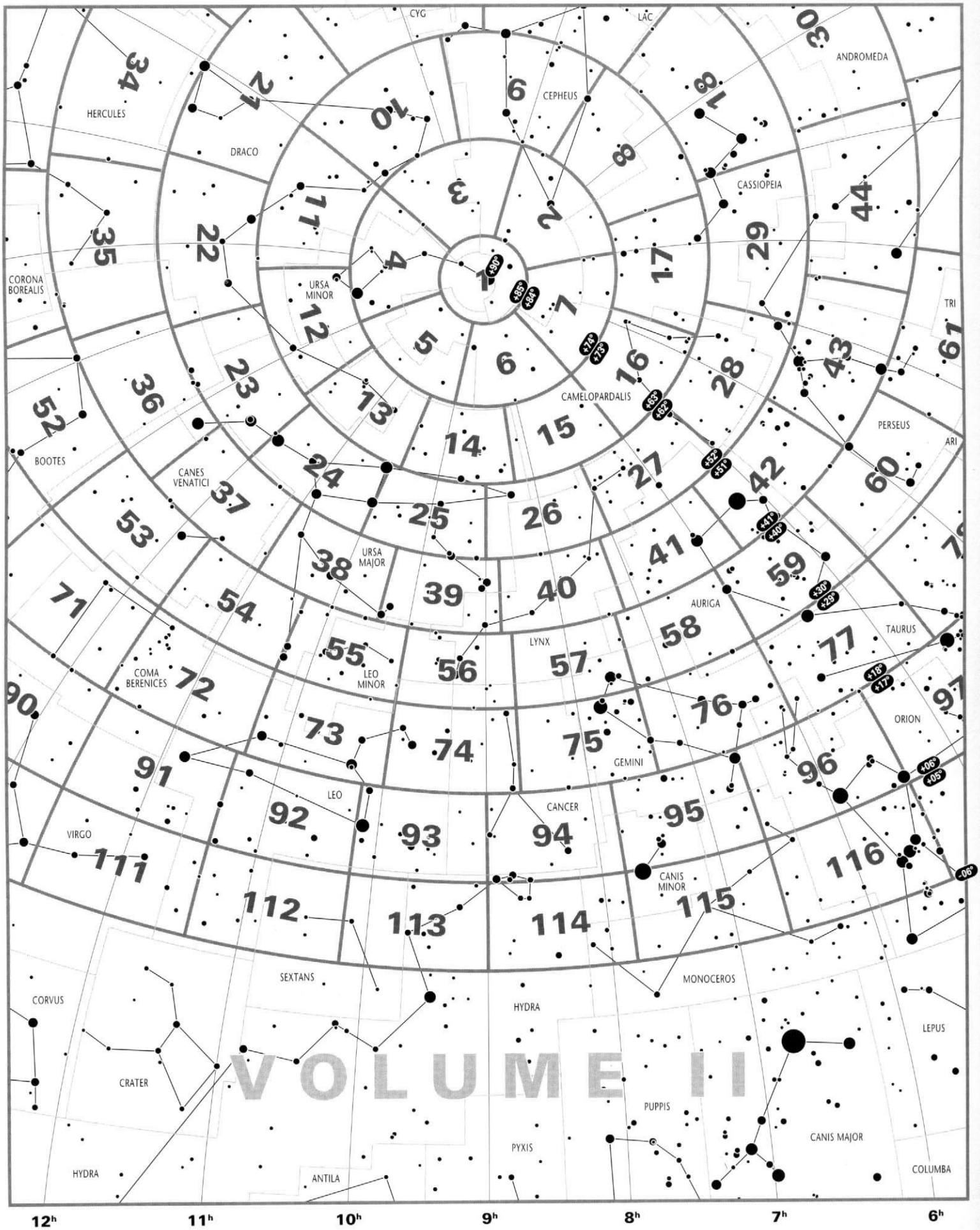
Index N3 — Volume I — 12h to 6h



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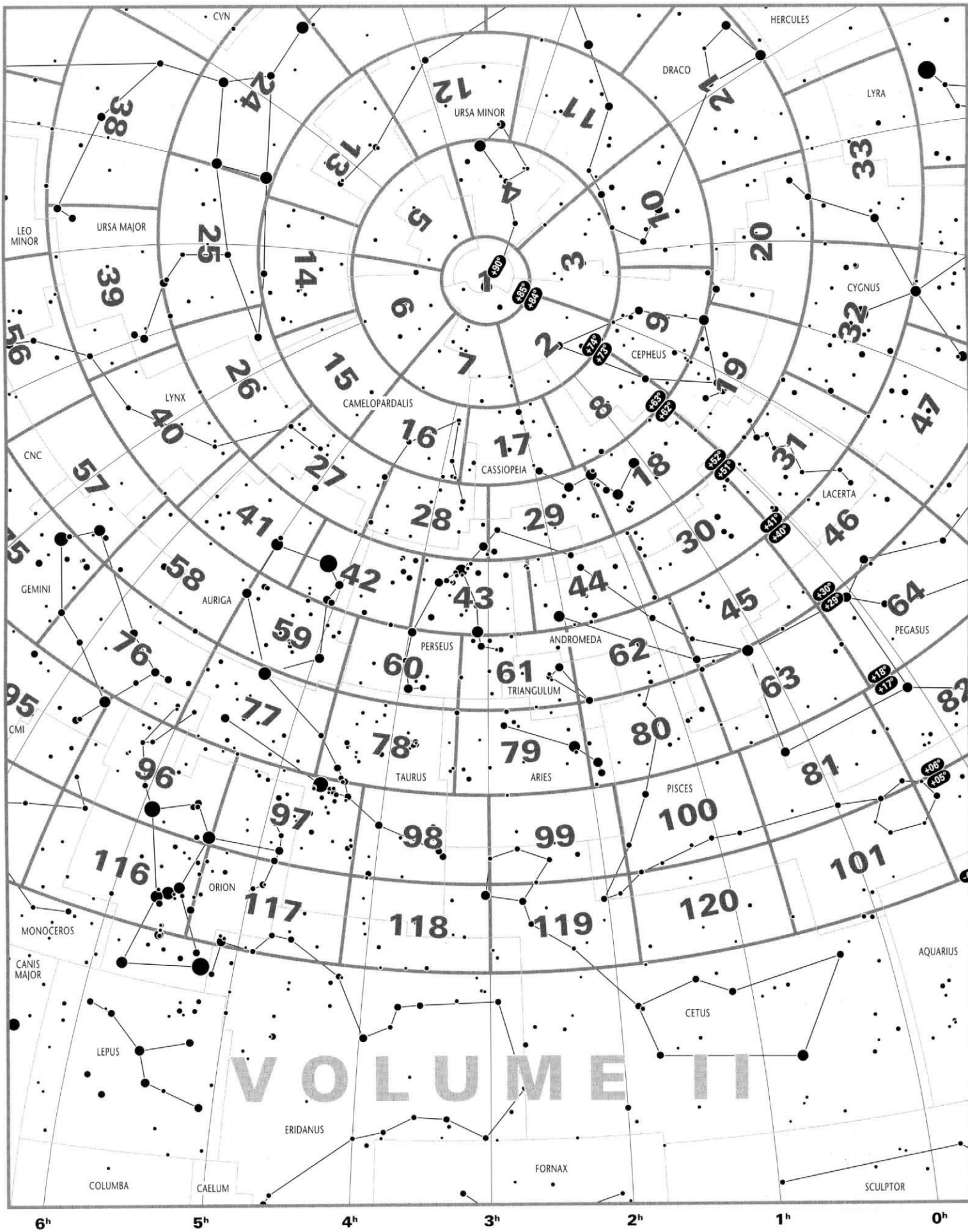
Index N4 — Volume I — 6h to 0h



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Common Names

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Key

GX = Galaxy	GC = Globular Cluster	DN = Dark Nebula	R + X = Radio + X-ray
GXCL = Galaxy Cluster	Star Cld = Star Cloud	PN = Planetary Nebula	QSO = Quasi-stellar Object
OC = Open Cluster	BN = Bright Nebula	RAD = Radio	SNR = Supernova Remnant

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